PB85-165488

Determination of Activated Sludge Biokinetic Constants for Chemical and Plastic Industrial Wastewaters: Appendix B

Oklahoma State Univ., Stillwater

Prepared for

Robert S. Kerr Environmental Research Lab.
Ada, OK

Feb 85

U.S. Department of Commerce
National Technical Information Service
NTIS

PB85-165488

EPA/600/2-83/073c
February 1985

DETERMINATION OF ACTIVATED SLUDGE BIOKINETIC CONSTANTS FOR CHEMICAL AND PLASTIC INDUSTRIAL WASTEWATERS
APPENDIX B

by

Don F. Kincannon and Enos L. Stover
School of Civil Engineering
Oklahoma State University
Stillwater, Oklahoma 74078

Cooperative Agreement
CR-810293

Project Officer

Dr. Thomas E. Short, Jr.
Subsurface Systems Branch
Robert S. Kerr Environmental Research Laboratory
Ada, Oklahoma 74820

ROBERT S. KERR ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
ADA, OKLAHOMA 74820

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/2-83-073c	2.	3. RECIPIENT'S ACCESSION NO. PB85 165488/AS
4. TITLE AND SUBTITLE Determination of Activated Sludge Biokinetic Constants for Chemical and Plastic Industrial Wastewaters (Appendix B)		5. REPORT DATE February 1985 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Don F. Kincannon and Enos L. Stover		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS School of Civil Engineering Oklahoma State University Stillwater, OK 74078		10. PROGRAM ELEMENT NO. 5ABW63LOCO (Obj. Code 2401) 11. ~~CONTRACT/GRANT NO.~~ Coop. Agr. CR810293
12. SPONSORING AGENCY NAME AND ADDRESS Robert S. Kerr Environmental Research Laboratory Office of Research and Development U.S. Environmental Protection Agency P.O. Box 1198, Ada, OK 74820		13. TYPE OF REPORT AND PERIOD COVERED Final 09/01/82 - 01/01/85 14. SPONSORING AGENCY CODE EPA-600/15

15. SUPPLEMENTARY NOTES

Project Officer: Thomas E. Short

16. ABSTRACT

The most widely used method of wastewater treatment is biological treatment. The use of kinetic models to describe the behavior of a biological wastewater treatment process has become widely accepted practice. The most often used kinetic models include those developed by Eckenfelder, McKinney, Lawrence and McCarty, and Gaudy. All of these models contain kinetic constants, and the usefulness of each model is a function of the reliability of the kinetic constants. However, there has not been enough information available to establish reliable values for these kinetic constants for industrial wastewaters.

This continued project has determined the biokinetic constants and fate for twelve additional toxic organic pollutants when present in a highly biodegradable wastewater. The normal approach for determining biokinetic constants has been to plot the average values. This approach masks the actual scatter of the data. This study has produced a methodology for analysis of the test results from biological activated sludge systems for determining the biological variability inherent in these types of systems.

This study also investigated the possibility of predicting the fate and effluent concentrations of the various priority pollutants. It was found that good predictions for the priority pollutants can be made.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Activated Sludge Sewage Treatment	Priority pollutants Combined industrial/ municipal Kinetic Constants	06A

18. DISTRIBUTION STATEMENT Release to public	19. SECURITY CLASS *(This Report)* Unclassified	21. NO. OF PAGES 194
	20. SECURITY CLASS *(This page)* Unclassified	22. PRICE

EPA Form 2220-1 (9-73)

DISCLAIMER

The information in this document has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement CR-810293 to Oklahoma State University. It has been subjected to the Agency's peer and administrative review and has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

FOREWORD

EPA is charged by Congress to protect the Nation's land, air, and water systems. Under a mandate of national environmental laws focused on air and water quality, solid waste management and the control of toxic substances, pesticides, noise, and radiation, the Agency strives to formulate and implement actions which lead to a compatible balance between human activities and the ability of natural systems to support and nurture life.

The Robert S. Kerr Environmental Research Laboratory is the Agency's center of expertise for investigation of the soil and subsurface environment. Personnel at the Laboratory are responsible for management of research programs to: (a) determine the fate, transport and transformation rates of pollutants in the soil, the unsaturated zone and the saturated zones of the subsurface environment; (b) define the processes to be used in characterizing the soil and subsurface environment as a receptor of pollutants; (c) develop techniques for predicting the effect of pollutants on ground water, soil and indigenous organisms; and (d) define and demonstrate the applicability and limitations of using natural processes, indigenous to the soil and subsurface environment, for the protection of this resource.

EPA, as provided for in the Clean Water Act, has the responsibility to promulgate regulations to protect streams and publicly owned treatment works. An important consideration is the economic impact that these regulations may have. This appendix summarizes a study of the biokinetic constants and environmental fate for 12 additional toxic organic pollutants. This information will aid the Agency in its effort to determine the economic impact that specific effluent guidelines may have on a particular industry.

Clinton W. Hall

Clinton W. Hall
Director
Robert S. Kerr Environmental Research Laboratory

ABSTRACT

The most widely used method of wastewater treatment is biological treatment. The use of kinetic models to describe the behavior of a biological wastewater treatment process has become widely accepted practice. The most often used kinetic models include those developed by Eckenfelder, McKinney, Lawrence and McCarty, and Gaudy. Recently, Kincannon and Stover introduced a model that shows great promise.

Cooperative Agreement CR-810293-01-0 determined the biokinetic constants needed for the design models for twelve toxic pollutants when present in a highly biodegradable wastewater. Biokinetic constants were also determined for four groups of three chemicals. The biokinetic constants were determined based upon biochemical oxygen demand (BOD_5), total organic carbon (TOC), and chemical oxygen demand (COD).

The fate of the twelve chemicals during biological treatment was also determined. It was determined whether the chemicals were removed by biodegradation, sorption, stripping, or combinations of these mechanisms.

Continuous flow, internal recycle activated sludge pilot plants were used to develop the data needed for determining the biokinetic constants and the fate of the specific chemicals.

Cooperative Agreement CR-810293-01-0 is a continuation of the work reported in "Determination of Activated Sludge Biokinetic Constants for Chemical and Plastic Industrial Wastewater," EPA-600/2-83-073a.

CONTENTS

Foreword iii
Abstract iv
Figures vi
Tables vii
Abbreviations and Symbols ix

1. Introduction 1
2. Conclusions and Recommendations. 3
3. Materials and Methods. 4
    General Experimental Plan 4
    Description and Operation of Pilot Plants 4
    Sample Schedule 7
    Project Management. 10
        Quality Assurance of Pilot Plant Operations. 10
        Laboratory Procedures. 11
        Internal Quality Control Practices 13
4. Results 14
    Performance of Pilot Plants 14
    Biokinetic Constants 14
    Fate of Specific Chemicals 34
References 37
Appendix 38

FIGURES

Number Page

1 Bench-scale activated sludge pilot plants. 5

TABLES

Number Page

1 Wastewater Concentrations 8

2 Chemical Characteristics. 9

3 Sludge Age, Hydraulic Residence Time, and Mixed Liquor Solids for Single Systems. 15

4 Influent and Effluent BOD_5 for Single Systems 16

5 Influent and Effluent TOC for Single Systems. 17

6 Influent and Effluent COD for Single Systems. 18

7 Effluent Solids, Sludge Volume Index, and Oxygen Uptake Rate for Single Systems 19

8 Influent, Effluent, and Sludge Concentrations of Specific Compound for Single Systems 20

9 Sludge Age, Hydraulic Residence Time, and Mixed Liquor Solids for Combined Systems 21

10 Influent and Effluent BOD_5 for Combined Systems 22

11 Influent and Effluent COD for Combined Systems. 23

12 Influent and Effluent TOC for Combined Systems. 24

13 Effluent Solids, Sludge Volume Index, and Oxygen Uptake Rate for Combined Systems. 25

14 Influent, Effluent, and Sludge Concentrations of Specific Compounds for Combined Systems 26

15 BOD_5 Biokinetic Constants for Single Chemical Systems 29

16 TOC Biokinetic Constants for Single Chemical Systems. 30

17 COD Biokinetic Constants for Single Chemical Systems. 31

18 Biokinetic Constants for Combined Systems 32

TABLES (continued)

Number Page

19 Removal Mechanisms for Specific Chemicals in Single Systems 33

20 Removal Mechanisms for Specific Chemicals in Combined Systems 35

21 Effluent Achieved for Specific Chemical. 36

LIST OF ABBREVIATIONS AND SYMBOLS

BOD_5 -- biochemical oxygen demand
COD -- chemical oxygen demand
F -- flow rate
F/M -- food to microorganism ratio FS_i/XV
F_w -- waste sludge flow rate
K -- Lawrence and McCarty's maximum substrate utilization rate
K_b -- substrate loading at which the rate of substrate utilization is one-half the maximum rate
k_d -- maintenance energy or decay coefficient
K_e -- Eckenfelder's first order substrate removal rate constant
K_e' -- Eckenfelder's second order substrate removal rate constant
K_L -- stripping rate constant
K_m -- Mckinny's substrate removal rate
K_s -- saturation constant
MLSS -- mixed liquor suspended solids
MLVSS -- mixed liquor volatile suspended solids
S_e -- effluent substrate concentration
S_i -- influent substrate concentration
SRT -- sludge retention time, θ_c
SVI -- sludge volume index
TC -- SRT (sludge retention time)
TOC -- total organic carbon
U --$S_i - S_e/Xt$, specific substrate utilization
U_{max} -- maximum substrate utilization rate
V -- volume
VSS -- volatile suspended solids
X -- biological solids
X_e -- effluent suspended solids

X_r -- underflow solids concentration

Y_t -- true yield

α -- recycle flow ratio

θ_c -- SRT (sludge retention time)

μ_n -- observed growth rate

μ_{max} -- maximum growth rate

SECTION 1

INTRODUCTION

Provisions in the Clean Water Act clearly require the U.S. Environmental Protection Agency to promulgate regulations to protect streams and publicly owned treatment works and to see to it that regulatory practices are in place to protect the vast investment of public funds. This law can affect nearly all industrial manufacturing plants now discharging or planning to discharge into POTW's or a stream. An important category for which effluent guidelines are needed is waste components from chemical and plastic industries. For this category, the problem is extremely difficult because of the thousands of different chemicals produced at plants across the nation. The product lines of these plants, and thus the nature of the wastes, are not fixed and change with market needs. This industrial activity consequently produces wastewaters of great and changing variety in the types of pollutants they contain. Furthermore, a significant number of the growing list of priority pollutants are appearing in various waste streams from the manufacturing of chemicals and plastics.

Because of the immensity and tremendous variety of products and process routes from production, it is logical that a computer programming procedure would be developed to handle the definition of wastewater composition as well as alternate processing routes for the treatment of wastewater. Computer programs have been developed that can combine waste load information on each product, select various product treatability routes, combine them, design and cost-out a plant's treatment system, and, finally, allocate the estimated treatment costs to the contributing product process route. However, before plant costs can be modeled, the treatment design models must be established. Design models are available but the biokinetic parameters for the chemical and plastic industries are not available. Therefore, the determination of the biokinetic parameters becomes of vital concern to the success of the cost model.

The current best-practical technology (BPT) for treatment of chemical industrial and plastic manufacturing wastes usually involves activated sludge since biological treatment is often found to be the most cost effective in dealing with relatively low concentrations of the types of organic materials in such wastes.

Modern approaches for the design of activated sludge employ mathematical process models depicting the relationships among factors affecting the kinetics of wastewater purification. All design models require quantitative assessment of numerical values for biokinetic constants for the activated sludge in question. These values are, in general, a function of the type of carbon source comprising the carbonaceous biochemical oxygen demand. Various models are available for use in designing activated sludge processes.

Cooperative Agreement CR-806843-01-02 determined the biokinetic constants and fate for twenty-four toxic organic pollutants when present in a highly biodegradable wastewater. The objective of this study was to extend this work by studying twelve additional toxic chemicals.

Since this work is a continuation of the work reported in "Determination of Activated Sludge Biokinetic Constants for Chemical and Plastic Industrial Wastewater," EPA-600/2-83-073a, many of the basic procedures have not been included in this report. If the reader is interested in the basic procedures they should consult the above reference.

SECTION 2

CONCLUSIONS AND RECOMMENDATIONS

High treatment efficiencies (in terms of biochemical oxygen demand, BOD_5; chemical oxygen demand, COD; and total organic carbon, TOC) can be achieved by biological treatment of wastewaters containing toxic priority pollutants. This study has shown that priority pollutants can be accommodated in biological wastewater treatment processes. In addition, it was found that many of the priority pollutants were biodegraded to very low concentrations. In other cases, the priority pollutants were stripped or sorbed to low levels without interfering with the biodegradation of the other organics.

The biokinetic constants of the wastewaters containing the priority pollutants are representative of a readily biodegradable wastewater. The biokinetic constants for Eckenfelder, Lawrence and McCarty, and Gaudy's design models are subject to variability. The Kincannon and Stover model provides a method for eliminating the variability of the system. This new model provides designs comparable with the other design models without the variability of the biokinetic constants.

Priority pollutants are removed by biodegradation, stripping, sorption, or combinations of these mechanisms. When biodegradation is the major mechanism of removal, the priority pollutants are removed to their lowest concentrations. Stripping and sorption mechanisms do not remove the pollutants to effluent levels as low as those accomplished by biodegradation.

This study and cooperative agreement CR 806843-010-02 have shown that wastewaters containing priority pollutants can be successfully treated by biological processes.

SECTION 3

MATERIALS AND METHODS

GENERAL EXPERIMENTAL PLAN

Continuous flow, internal recycle activated sludge pilot plants were used to develop the data needed for determining biokinetic constants. Three specific chemicals were studied each quarter. Activated sludge for starting the pilot plants was obtained from the Southside wastewater treatment plant, Tulsa, Oklahoma. The pilot plants were acclimated to the synthetic wastewater for four weeks and then sampled for two months. Twelve pilot plants were operated to provide three SRT's for each specific chemical and three SRT's for the three chemicals combined in one wastewater.

The pilot plants were sealed reactors which made the measurement of the off-gases possible. Thus, the experimental procedures allowed for the determination of the fate of the specific chemicals.

DESCRIPTION AND OPERATION OF PILOT PLANTS

A schematic of the bench-scale activated sludge pilot plants is shown in Figure 1. These systems consisted of stainless steel internal recycle reactors with 3.0 liter activated sludge reactor volumes and 3.23 liter settling compartment volumes. The reactor and settling compartment were both fitted with air tight stainless steel covers to facilitate off-gas analysis. The wastewaters were pumped from sealed feed tanks to the reactors, and the effluents flowed by gravity from the settling compartments to collection tanks. All parts of the experimental system were constructed of materials to minimize contamination.

The influent wastewater flow rates were regulated to provide hydraulic retention times of 8 hours in the activated sludge reactors. The influent air and off-gas were measured and controlled with air flow meters. The off-gas was pulled by vacuum pumps through purge traps containing 6 inches of Tenax and 4 inches of silica gel for gas chromatograph analysis.

The following procedure was used for daily operation of the internal recycle pilot plants.

1. The feed pump was set at a flow rate to prove a hydraulic detention time of eight hours.

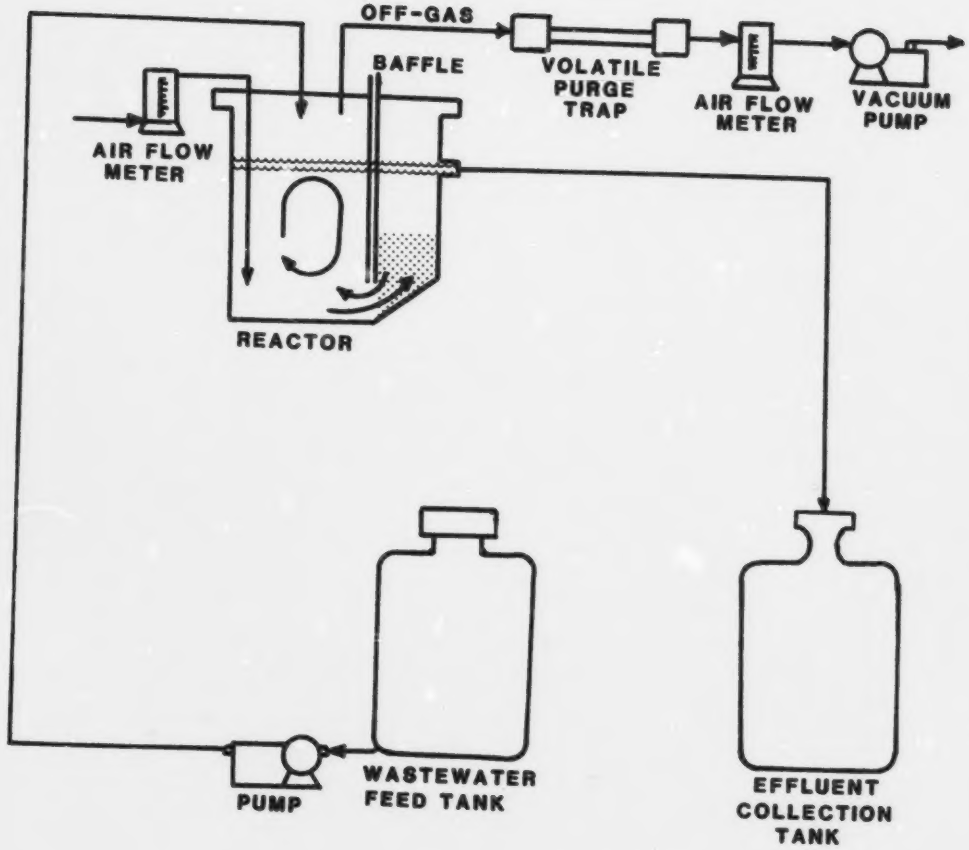

Figure 1. Bench-scale activated sludge pilot plants.

2. The adjustable baffle was set at a level that provided good return flow of the return solids. This required adjusting the baffle several times per day.

3. MLVSS were wasted once each day to provide desired SRT. This was accomplished by the following procedure:

   a. A sample was collected from the aeration chamber for MLVSS analysis.

   b. The clarified effluent collection tank was mixed and a sample taken for VSS analysis.

   c. The sludge waste flow rate was calculated by

$$F_w = \frac{\frac{VX}{SRT} - FX_e}{X - X_e}$$

where:

F_w = waste sludge flow rate, l/day

SRT = sludge age, days

V = volume of reactor, liters

F = influent flow rate/day

X_e = effluent volatile suspended solids, mg/ℓ

X = MLVSS, mg/ℓ

   d. The baffle was pulled and the aeration chamber and clarifier were allowed to mix.

   e. A volume equal to the calculated F_w was withdrawn from the entire volume and wasted.

   f. The baffle was reset.

The municipal activated sludge was allowed to acclimate to the "base mix" wastewater for one week and then the organic compound was added to the wastewater. The organic compound was first added at a low concentration. This concentration was increased slightly each two or three days until the desired concentration was reached. This build-up period took from two to three weeks. Three pilot plants were operated for each compound - each at a different SRT. The SRT's were selected so that there would be a spread in the effluent BOD_5 achieved by the three pilot plants.

During each quarter the pilot plants were operated as:

Set No.	Number of Pilot Plants	Feed	Remarks
1	3	BM*+ compound A	Three sludge ages
2	3	BM + compound B	Three sludge ages
3	3	BM + compound C	Three sludge ages
4	3	BM + A, B, C	Three sludge ages

*BM = base mix

A total of twelve pilot plants were operated at a time. The concentration of compounds A, B, and C in the combined units was one-third of the concentration of those compounds in the other units.

The synthetic wastewater included selected organic chemicals combined with a "base mix". The "base mix" was a readily biodegradable substrate which consisted of:

ethylene glycol	1 volume
ethyl alcohol	1 volume
acetic acid	1 volume
glutamic acid	1 weight
glucose	1 weight
phenol	0.2 weight
ammonium sulfate	1.8 weight
phosphoric acid	0.14 volume
magnesium sulfate	0.7 weight
manganese sulfate	0.07 weight
calcium chloride	0.07 weight
ferric chloride	0.004 weight

Note: use of 1 gm of weight equivalent to 1 mℓ of volume

The "base mix" was proportioned so that the BOD_5 due to the "base mix" would be approximately 250 mg/ℓ. Any BOD_5 attributed to the study chemical would add to the 250 mg/ℓ. Table 1 gives the average influent BOD_5, TOC, and COD for the twelve reactors. Table 2 gives some chemical characteristics for the twelve chemicals.

SAMPLE SCHEDULE

The following sample schedule was followed:

Parameter	Frequency
Influent	
Flow rate	Several times per day
BOD_5	3 per week
TOC	3 per week
COD	1 per week
pH	daily
Specific chemical	1 per week

TABLE 1. WASTEWATER CONCENTRATIONS

Group	Chemical	Wastewater Concentrations, mg/ℓ		
		BOD_5	TOC	COD
I	Anthracene	273	133	449
	Dimethyl phthalate	313	149	505
	Hexachloroethane	278	134	485
	Combined	299	134	499
II	1,2-dichloroethylene	255	119	316
	4-nitrophenol	302	134	482
	2,4,6-trichlorophenol	353	153	505
	Combined	339	154	501
III	Fluoranthene	268	185	426
	2-chloronaphthalene	255	201	424
	Hydrazobenzene	271	201	424
	Combined	265	190	406
IV	Nickel	214	167	318
	Cadmium	229	162	276
	Chromium	253	181	343
	Combined	264	171	336

TABLE 2. CHEMICAL CHARACTERISTICS

Chemical	Henry's Law Constant atm.m^3/mole	Molecular Weight	Log P_{ow}	Solubility mg/ℓ
Anthracene	N.A.	178.2	4.45	0.073
Dimethyl Phthalate	N.A.	194.2	2.12	4,300
Hexachloroethane	9.85×10^{-3}	236.7	3.34	50
1,2-dichloroethylene	1.5×10^{-2}	96.9	1.48	5,000
4-nitrophenol	N.A.	139.1	1.91	16,000
2,4,6-trichlorophenol	N.A.	197.4	3.38	800
Fluoranthene	N.A.	202.3	5.33	0.26
2-chloronaphthalene	N.A.	162.6	4.12	6.74
Hrydazobenzene	N.A.	184.2	3.03	221
Nickel	N.A.	58.7	N.A.	6.42×10^5 ($NiCl_2$)
Cadmium	N.A.	112.4	N.A.	1.40×10^6 ($CdCl_2$)
Chromium	N.A.	52.0	N.A.	6.17×10^5 (C_rO_3)

Parameter	Frequency
Effluent	
BOD_5	3 per week
TOC	3 per week
COD	1 per week
Suspended solids	3 per week
VSS	3 per week
specific chemical	1 per week
Aeration Basin	
MLSS	3 per week
MLVSS	3 per week
Dissolved oxygen	daily
Dissolved oxygen uptake	3 per week
SVI	1 per week
pH	daily
off-gas	1 per week
specific compound of mixed liquor	1 per week
Temperature	daily

PROJECT MANAGEMENT

The successful conduct of this Cooperative Agreement centered around the proper operation of the pilot plants, proper laboratory procedures, and the correct interpretation of the data. Therefore, a quality assurance plan was developed to accomplish the goals of the project.

Management

The project director and co-principal investigator maintained complete control of the project. They inspected the pilot plants at least two times each day. Some days the inspection visits were as many as four or five. These inspections ensured that the pilot plants were being operated in a proper manner. Such items as wastewater feed rates, air flow rates, baffle settings, and MLSS conditions were checked. Proper laboratory procedures were also routinely checked.

The project director and the co-principal investigator routinely checked all instruments and performed most routine maintenance of the laboratory instruments. They also provided unknown and spiked samples for analyses. All data analyses were conducted by these two.

Once a week a meeting of all personnel was held. A review of the week's activities was conducted. All problems encountered during the week were discussed by the group. This allowed all personnel to be aware of all problems encountered. Plans for the coming week were also outlined during this meeting.

Quality Assurance of Pilot Plant Operation

The key factors in the proper operation of the pilot plants included

1. Cleaning of wastewater feed tank and feed lines:
2. Making up synthetic wastewater feed.
3. Adjustment of baffle.
4. Pump flow rates.
5. Air flow rates.

To ensure that biological growth did not develop in the wastewater feed tank or lines, a disinfection program was developed. This included acid washing of the feed tank each time fresh synthetic wastewater was made up and chlorination of each feed line every fourth day. After the disinfection operation, the feed tank and lines were thoroughly rinsed with tap water before being put back into operation.

It was important that the synthetic wastewater have the proper ingredients. To ensure this, TOC, COD, and BOD_5 were routinely conducted on the synthetic wastewater. Also, gas chromatography analyses were made to measure the concentration of the specific organic compound under study.

Proper adjustment of the baffle of each pilot plant is a matter of experience. Also, either the project director or co-principal investigator checked the flow rates daily. The flow rate was checked by the volume-time method.

Laboratory Procedures

Quality assurance in the laboratory involved reagents, glassware, instruments, and analytical techniques. The laboratory analyses conducted for this project included:

1. BOD_5 - 5 day biochemical oxygen demand
2. TOC - total organic carbon
3. COD - chemical oxygen demand
4. Suspended solids
5. Volatile suspended solids
6. D.O. - dissolved oxygen
7. pH
8. Gas chromatography analyses
9. Atomic absorption analysis of metals

Sample Preservation:

Analyses were conducted immediately for most tests. However, there were times that this was not possible. For those instances the samples were filtered and stored at 4°C.

Analytical Methods:

The following analytical methods were used:

Parameter	Method
BOD_5	EPA and/or Standard Methods used. Dissolved oxygen measured by Probe method. Both total and soluble BOD_5 were determined. Soluble is defined as that left after filtering with a glass fiber filter.

Parameter	Method
TOC	Beckman 915 TOC Analyzer and Oceanography 05248 used. Only soluble TOC was determined.
COD	EPA and/or Standard Methods used
Suspended Solids	EPA and/or Standard Methods used. Reeve angel type 934-AH glass fiber filter used.
Volatilive Solids	EPA and/or Standard Methods used
Dissolved Oxygen	Probe method
pH	Instrument
Specific organic compound	Analyses followed the instructions for gas chromatograph analysis given in the Federal Register, Volume 44, Number 233, December 4, 1979. F & M Model 810 GC with Tekmar LC-Purge and Trap and HP 3380 Integrator. HP 7626A GC with HP 3380 Integrator. Perkin-Elmer Sigma 3B GC.
Metals	Total metals were digested according to EPA's March/April 1977 Protocol Atomic Absorption Newsletter 14 (5) 109' (1975), using distilled HNO_3 and H_2O_2. Perkin-Elmer 5000 AA with Graphite Furnace was used for metals analysis.

Glassware

Standard Kimax or Pyrex brand glassware was used in this study. All glassware was chromic acid washed before use.

Instruments

An analytical laboratory depends very heavily upon instrumentation. It was very important that these instruments be maintained in proper working conditions. The discussion below illustrates how this project ensured that these instruments were working properly.

1. Analytical Balance. The analytical balance was mounted on a heavy shock-proof table and was checked and adjusted yearly by a company serviceman. Accuracy of balance was routinely checked by using known weights.

2. pH Meters. The pH meters used for this project were standardized daily by using standard buffer solutions.

3. Beckman 915 TOC Analyzer. The Beckman TOC Analyzer required good maintenance and operation practices to ensure continuous operation. The following maintenance was performed once per month:

a) repack combustion tube

b) clean and dry microfilter

c) clean and dry infrared cell

For improved operation, the instrument remained on continuously and was preconditioned with repeated injections of distilled water to obtain stable operating conditions before actual sample injection.

4. Oceanographic Total Carbon Analyzer. The main concern with this instrument was to ensure that there were no leaks in the system and that the drying tubes were replaced regularly with granular magnesium perchlorate.

5. Dissolved Oxygen Probe. The dissolved oxygen probe was calibrated before each series of analyses.

Internal Quality Control Practices

Internal quality control practices varied for the various tests. These were:

1. BOD_5 - There are no good methods for testing the reliability of the BOD test. Our control used duplicate samples and spiked samples prepared by the project director.
2. TOC - Linearity of standards, duplicates, and recoveries from spiked solutions provided the quality assurance of the TOC analysis.
3. COD - The ferrous ammonium sulfate titrant was standardized as part of the test. Duplicates and recoveries from spiked solutions provided the quality assurance for the COD test.
4. Suspended Solids - Duplicate samples provided the only quality assurance for suspended solids.
5. GC Analysis for Specific Compounds - Quality assurance involved determining linearity of the analytical range, replicate runs, and recoveries from spiked solutions.
6. Atomic Absorption of Specific Metals - Quality assurance involved determining linearity of the analytical range, replicate runs, and recoveries from spiked solutions.

SECTION 4

RESULTS

PERFORMANCE OF PILOT PLANTS

Twelve chemicals have been studied in the complete mix continuous flow bench scale activated sludge pilot plants. Summaries of the operating conditions and responses of the single chemical systems are shown in Table 3-8. In addition, summaries of the operating conditions and responses of the combined chemical systems are shown in Tables 9-14. The chemicals associated with each group were given in Table 1.

Table 3 provides the mean and standard deviation (SD) values of the sludge age (SRT), hydraulic residence time (HRT), and the mixed liquor volatile suspended solids (MLVSS) for the single chemical systems. Table 4 gives the influent and effluent BOD_5 along with the SRT and F/M ratio for the single chemical systems. Tables 5 and 6 provide the influent and effluent TOC and COD along with the respective F/M ratios for the single chemical systems. Table 7 gives the effluent volatile solids, sludge volume index and oxygen uptake rate for the single chemical systems. Table 8 gives the influent and effluent specific chemical values for the single chemical systems. By studying the data in these tables, it can be seen that the single chemical systems performed very well during the study. High removal levels of BOD_5, TOC, COD, and specific chemicals were observed. In some cases the effluent suspended solids were high; however, in most cases they were at acceptable levels. Oxygen uptake rates were within acceptable levels and did not indicate any adverse effects from the wastewaters.

Table 9 provides the SRT, HRT, and MLVSS values for the various combined systems. Tables 10, 11, and 12 give the influent and effluent BOD_5, TOC, and COD, respectively, along with the corresponding F/M ratios. Table 13 provides the effluent suspended solids, sludge volume index, and oxygen uptake rate for the combined chemical systems. Table 14 gives the influent and effluent concentrations of the specific compounds for the combined chemicals. It is seen from these tables that the combined chemical systems also performed very well. No apparent adverse effects from the chemicals were observed.

BIOKINETIC CONSTANTS

The aim of all design models is to provide more accurate predictive equations which are in keeping with the underlying metabolic and biological

TABLE 3. SLUDGE AGE, HYDRAULIC RESIDENCE TIME, AND MIXED LIQUOR SOLIDS FOR SINGLE SYSTEMS

Compound	SRT, days		HRT, hours		MLVSS, mg/ℓ	
	mean	S.D.	mean	S.D.	mean	S.D.
Anthracene	1.17	1.20	8.52	1.53	478	235
	2.27	0.97	8.12	0.58	1001	477
	5.27	1.66	8.31	0.82	1548	463
Dimethyl phthalate	1.00	0.01	7.91	0.23	491	127
	2.70	0.77	8.45	1.46	1109	379
	4.23	2.25	8.08	0.04	1096	425
Hexachloroethane	1.00	0.00	8.01	0.01	594	329
	2.79	0.74	8.01	0.00	935	265
	5.94	0.32	8.01	0.00	1483	202
1,2-dichloroethylene	0.98	0.21	8.22	1.49	470	146
	2.90	0.61	8.41	1.48	1005	246
	5.78	3.83	8.39	1.47	1287	411
4-nitrophenol	0.94	0.22	8.34	1.47	453	146
	2.92	0.94	8.42	1.49	982	382
	6.45	3.92	8.36	1.48	1526	749
2,46-trichlorophenol	1.00	0.00	7.85	0.09	625	266
	2.96	0.16	8.10	0.10	1131	163
	5.97	3.50	8.12	0.15	1722	301
Fluoranthene	1.02	0.08	8.04	0.10	344	93
	3.02	0.13	8.07	0.09	936	138
	9.31	1.53	8.03	0.06	1930	174
2-chloronaphthalene	1.00	0.00	7.94	0.24	517	112
	3.02	0.03	8.13	0.15	1042	136
	9.28	1.73	8.17	0.27	2015	454
Hydrazobenzene	1.00	0.00	8.17	0.37	445	85
	3.00	0.03	8.02	0.34	1165	177
	10.08	0.38	7.91	0.36	2441	257
Nickel	1.01	0.04	8.06	0.15	351	101
	2.88	0.30	7.99	0.18	719	254
	10.08	0.23	8.12	0.10	2192	168
Cadmium	1.03	0.05	8.04	0.06	322	76
	3.06	0.06	8.01	0.03	708	45
	9.92	1.05	7.98	0.04	1288	314
Chromium	1.00	0.00	7.87	0.25	418	142
	2.96	0.20	8.37	0.69	1013	383
	9.98	0.07	7.45	0.94	2369	386

TABLE 4. INFLUENT AND EFFLUENT BOD_5 FOR SINGLE SYSTEMS

Compound	SRT, days		F/M		Inf.Bod_5 mg/ℓ		Eff.BOD_5 mg/ℓ	
	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.
Anthracene	1.17	1.20	1.88	0.91	273	71	2.6	3.1
	2.28	0.97	1.04	0.62	281	40	1.7	2.6
	5.27	1.66	0.60	0.29	287	42	2.0	2.7
Dimethyl Phthalate	1.00	0.01	2.03	0.55	313	46	6.1	5.0
	2.70	0.77	0.82	0.26	302	77	2.3	2.9
	4.23	2.25	0.99	0.41	313	46	3.0	3.0
Hexachloroethane	1.00	0.00	1.77	0.87	278	47	5.0	3.6
	2.79	0.74	1.00	0.54	278	47	2.7	2.8
	5.94	0.32	0.58	0.14	278	47	1.3	0.8
1,2-dichloroethylene	0.98	0.21	1.64	0.54	255	71	4.4	3.3
	2.90	0.61	0.73	0.22	252	70	2.5	2.7
	5.78	3.83	0.60	0.25	252	70	3.1	3.1
4-nitrophenol	0.94	0.22	2.04	0.76	302	77	6.3	4.5
	2.52	0.94	1.00	0.52	302	77	3.7	2.9
	6.45	3.92	0.72	0.50	302	77	2.6	1.3
2,4,6-trichlorophenol	1.00	0.00	1.93	0.60	353	41	12.7	6.7
	2.96	0.16	0.94	0.14	353	41	4.7	3.7
	5.97	3.50	0.63	0.15	353	41	5.3	4.6
Fluoranthene	1.02	0.08	2.48	0.71	268	28	5.5	2.8
	3.02	0.13	0.86	0.14	268	28	2.6	1.3
	9.31	1.53	0.42	0.05	268	28	1.6	0.8
2-chloronaphthalene	1.00	0.00	1.59	0.54	255	20	4.5	2.6
	3.02	0.03	0.74	0.12	256	20	1.8	0.9
	9.28	1.73	0.40	0.12	256	20	1.3	0.8
Hydrazobenzene	1.00	0.00	1.85	0.37	271	22	5.8	3.6
	3.00	0.03	0.72	0.14	271	22	2.5	1.1
	10.08	0.38	0.34	0.04	271	22	1.4	0.8
Nickel	1.01	0.04	1.91	0.55	214	47	8.9	4.7
	2.88	0.30	1.03	0.44	214	47	3.0	1.7
	10.08	0.23	0.29	0.06	214	47	1.0	0.4
Cadmium	1.03	0.05	2.23	0.59	229	30	7.0	5.0
	3.06	0.06	0.98	0.16	231	31	3.7	2.1
	9.92	1.05	0.59	0.24	231	30	1.7	0.7
Chromium	1.00	0.00	1.99	0.50	253	33	8.8	8.3
	2.96	0.20	0.85	0.39	253	33	6.8	6.5
	9.98	0.07	0.33	0.05	256	27	3.1	3.7

TABLE 5. INFLUENT AND EFFLUENT TOC FOR SINGLE SYSTEMS

Compound	SRT, days		F/M		Influent mg/ℓ		Effluent mg/ℓ	
	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.
Anthracene	1.17	1.20	0.94	0.49	133	22	39	10
	2.28	0.97	0.45	0.19	130	25	30	11
	5.27	1.66	0.30	0.19	129	24	27	13
Dimethyl phthalate	1.00	0.01	0.95	0.37	149	30	33	11
	2.70	0.77	0.38	0.11	149	30	25	14
	4.23	2.25	0.48	0.18	149	30	30	14
Hexachloroethane	1.00	0.00	0.83	0.40	134	26	35	12
	2.79	0.74	0.50	0.28	133	26	27	12
	5.94	0.32	0.28	0.07	134	26	32	11
1,2-dichloroethylene	0.98	0.21	0.85	0.28	119	13	27	8
	2.90	0.61	0.34	0.05	119	13	27	9
	5.78	3.83	0.29	0.09	119	13	27	10
4-nitrophenol	0.94	0.22	0.91	0.36	134	37	29	13
	2.52	0.94	0.45	0.28	134	37	27	10
	6.45	3.92	0.32	0.20	135	37	23	8
2,4,6-trichlorophenol	1.00	0.00	0.83	0.26	153	14	40	15
	2.96	0.16	0.41	0.06	153	14	36	12
	5.97	3.50	0.27	0.05	153	14	33	12
Fluoranthene	1.02	0.08	1.70	0.44	185	30	29	7
	3.02	0.13	0.60	0.12	187	27	26	8
	9.31	1.53	0.30	0.06	185	30	16	8
2-chloronophthalene	1.00	0.00	1.24	0.37	2.01	38	22	4
	3.02	0.03	0.58	0.11	2.02	39	17	2
	9.28	1.73	0.30	0.07	196	23	19	8
Hydrazobenzene	1.00	0.00	1.34	0.21	201	23	34	7
	3.00	0.03	0.53	0.08	201	23	21	7
	10.08	0.38	0.25	0.04	201	23	18	5
Nickel	1.01	0.04	1.77	0.24	167	11	36	21
	2.88	0.30	1.03	0.25	167	11	27	15
	10.08	0.23	0.23	0.02	167	11	15	9
Cadmium	1.03	0.05	1.26	0.26	162	22	21	12
	3.06	0.06	0.67	0.08	161	21	27	12
	9.92	1.05	0.48	0.16	160	20	17	14
Chromium	1.00	0.00	1.58	0.53	181	11	40	33
	2.96	0.20	0.78	0.34	181	11	25	14
	9.98	0.07	0.27	0.05	181	11	18	9

TABLE 6. INFLUENT AND EFFLUENT COD FOR SINGLE SYSTEMS

Compound	SRT, days		F/M		Influent mg/ℓ		Effluent mg/ℓ	
	mean	S.D.	mean	S.D.	mean	S.D.	mean	S.D.
Anthracene	1.17	1.20	3.32	1.74	449	54	42	25
	2.28	0.97	1.27	0.67	380	165	43	30
	5.27	1.66	0.93	0.31	441	62	35	27
Dimethyl phthalate	1.00	0.01	3.25	1.03	505	133	55	23
	2.70	0.77	1.38	1.32	453	223	24	16
	4.23	2.25	1.56	0.68	505	133	38	23
Hexachloroethane	1.00	0.00	2.65	1.35	485	101	46	17
	2.79	0.74	1.58	0.17	494	106	39	30
	5.94	0.32	1.06	0.29	485	101	31	25
1,2-dichloroethylene	0.98	0.21	2.18	1.23	316	154	22	15
	2.90	0.61	0.99	0.40	348	133	20	13
	5.78	3.83	0.76	0.32	348	133	24	14
4-nitrophenol	0.94	0.22	3.04	1.87	482	272	44	35
	2.52	0.94	1.63	1.04	482	272	30	17
	6.45	3.92	1.03	0.57	482	272	24	19
2,4,6-trichlorophenol	1.00	0.00	2.85	0.78	505	91	43	39
	2.96	0.16	1.24	0.27	505	91	26	18
	5.97	3.50	0.92	0.17	505	91	31	24
Fluoranthene	1.02	0.08	4.08	1.07	426	76	27	24
	3.02	0.13	1.37	0.37	426	76	12	8
	9.31	1.53	0.63	0.07	426	76	7	4
2-chloronaphthalene	1.00	0.00	2.84	1.20	424	58	18	8
	3.02	0.03	1.25	0.35	424	58	13	7
	9.28	1.73	0.68	0.26	435	54	9	6
Hydrazobenzene	1.00	0.00	2.73	0.67	424	52	24	12
	3.00	0.03	1.14	0.22	424	52	20	9
	10.08	0.38	0.51	0.07	424	52	10	7
Nickel	1.01	0.04	2.82	0.93	318	52	35	14
	2.88	0.30	1.47	0.90	318	52	42	15
	10.08	0.23	0.43	0.07	318	52	23	11
Cadmium	1.03	0.05	2.67	0.53	276	13	47	14
	3.06	0.06	1.14	0.07	276	13	43	9
	9.92	1.05	0.74	0.25	291	38	25	7
Chromium	1.00	0.00	2.30	0.73	343	18	38	16
	2.96	0.20	1.41	1.00	343	18	30	10
	9.98	0.07	0.42	0.08	343	18	31	16

TABLE 7. EFFLUENT SOLIDS, SLUDGE VOLUME INDEX AND OXYGEN UPTAKE RATE FOR SINGLE SYSTEMS

Compound	SRT, days mean	SRT, days S.D.	Effluent VSS, mg/ℓ mean	Effluent VSS, mg/ℓ S.D.	SVI Range	O_2 Uptake mg/gm/hr mean
Anthracene	1.17	1.20	23	55	102-1648	22.7
	2.28	0.97	122	122	183-2041	12.7
	5.27	1.66	56	99	478-797	8.1
Dimethyl phthalate	1.00	0.01	21	12	94-1448	43.8
	2.70	0.77	61	84	590-1852	17.1
	4.23	2.25	82	89	556-1493	16.8
Hexachloroethane	1.00	0.00	17	24	84-1721	23.3
	2.79	0.74	47	95	721-1302	15.8
	5.94	0.32	19	27	508-797	14.0
1,2-dichloroethylene	0.98	0.21	22	30	419-3205	23.6
	2.90	0.61	9	16	704-1047	15.8
	5.78	3.83	116	122	552-1149	13.5
4-nitrophenol	0.94	0.22	38	52	187-2697	25.8
	2.52	0.94	64	93	131-2708	14.5
	6.45	3.92	93	128	326-1951	11.9
2,4,6-trichlorophenol	1.00	0.00	38	17	63-206	30.5
	2.96	0.16	19	18	261-813	17.5
	5.97	3.50	120	93	448-775	14.8
Fluoranthene	1.02	0.08	8	14	182-605	32.7
	3.02	0.13	6	11	546-1029	16.1
	9.31	1.53	21	33	398-515	10.3
2-chloronaphthalene	1.00	0.00	11	20	157-2439	36.0
	3.02	0.03	9	12	321-1136	18.2
	9.28	1.73	20	30	355-1031	13.2
Hydrazobenzene	1.00	0.00	12	14	98-188	27.0
	3.00	0.03	10	19	224-600	15.2
	10.08	0.38	5	7	325-408	10.9
Nickel	1.01	0.04	32	16	111-290	24.6
	2.88	0.30	22	21	105-282	13.5
	10.08	0.23	6	6	358-415	11.6
Cadmium	1.03	0.05	21	18	124-725	25.4
	3.06	0.06	6	9	172-625	17.2
	9.92	1.05	9	10	273-1020	12.5
Chromium	1.00	0.00	23	16	83-342	30.6
	2.96	0.20	16	16	79-570	18.3
	9.98	0.07	18	13	77-143	8.3

TABLE 8. INFLUENT, EFFLUENT, AND SLUDGE CONCENTRATIONS OF SPECIFIC COMPOUND FOR SINGLE SYSTEMS

Compound	SRT days	Influent μg/ℓ	Effluent μg/ℓ	Sludge μg/g
Anthracene	1.17	63	48	61
	2.28	63	44	42
	5.27	63	53	21
Dimethyl phthalate	1.00	37,250	262	≤ 10
	2.70	37,250	198	≤ 10
	4.23	37,250	132	≤ 10
Hexachloroethane	1.00	3,720	465	81
	2.79	3,720	371	64
	5.94	3,720	338	24
4-nitrophenol	0.94	32,300	1820	--
	2.52	32,300	2670	--
	6.45	32,300	2160	--
2,4,6-trichlorophenol	1.00	14,830	1790	8,190
	2.96	14,830	1470	753
	5.97	14,830	590	570
1,2-dichloroethylene	0.98	29,200	235	≤ 10
	2.90	29,200	320	≤ 10
	5.78	29,200	280	≤ 10
Fluoranthene	1.02	134	26	≤ 10
	3.02	134	29	≤ 10
	9.31	134	24	10
2-chloronatphthalene	1.00	2,020	49	≤ 10
	3.02	2,020	30	≤ 10
	9.28	2,020	25	27
Hydrazobenzene	1.00	4,180	2740	≤ 10
	3.00	4,180	2330	226
	10.08	4,180	2650	159
Nickel	1.01	3,860	2780	7,950
	2.88	3,860	3170	4,090
	10.08	3,860	2950	1,280
Cadmium	1.03	3,680	1280	24,830
	3.06	3,680	1170	16,980
	9.92	3,680	1110	18,160
Chromium	1.00	3,570	1120	42,380
	2.96	3,570	1520	21,120
	9.98	3,570	600	22,290

TABLE 9. SLUDGE AGE, HYDRAULIC RESIDENCE TIME, AND MIXED LIQUOR SOLIDS FOR COMBINED SYSTEMS

Combined System	SRT, days		HRT, days		MLVSS, mg/ℓ	
	mean	S.D.	mean	S.D.	mean	S.D.
I	1.01	0.03	8.08	0.05	568	198
Anthracene	2.42	0.97	8.41	0.77	1422	650
Dimethyl phthalate	4.93	1.59	8.00	0.00	1316	373
Hexachloroethane						
II	1.00	0.00	7.94	0.20	471	117
1,2 dichloroethylene	3.00	0.00	8.07	0.00	1414	258
4 nitrophenol	8.01	2.69	7.98	0.03	1798	254
2,4,6 trichlorophenol						
III	1.02	0.03	7.96	0.09	625	--
Fluoranthene	3.02	0.03	8.15	0.24	1153	95
2-chloronaphthalene	8.89	2.51	8.09	0.23	1869	436
Hydrazobenzene						
IV	1.00	0.00	8.10	0.40	425	186
Nickel	3.07	0.07	7.96	0.06	663	131
Cadmium	9.87	0.22	8.03	0.18	1741	229
Chromium						

TABLE 10. INFLUENT AND EFFLUENT BOD_5 FOR COMBINED SYSTEMS

Combined System	SRT, days	F/M	Influent BOD_5 mg/ℓ		Effluent BOD_5 mg/ℓ	
			mean	S.D.	mean	S.D.
I	1.01	1.74	294	46	4.3	4.3
	2.42	0.79	299	46	2.9	3.2
	4.93	0.72	295	45	3.3	3.8
II	1.00	2.27	339	49	4.6	3.1
	3.00	0.73	339	49	7.2	
	8.01	0.58	339	49	2.5	1.2
III	1.02	1.76	265	28	3.6	2.0
	3.02	0.68	266	29	2.1	1.1
	8.89	0.45	265	28	1.5	0.8
IV	1.00	2.40	264	28	13.5	9.6
	3.07	1.23	260	30	16.6	8.9
	9.87	0.45	260	30	6.1	7.0

TABLE 11. INFLUENT AND EFFLUENT COD FOR COMBINED SYSTEMS

Combined System	SRT days	F/M	Influent BOD_5 mg/ℓ		Effluent BOD_5 mg/ℓ	
			mean	S.D.	mean	S.D.
I	1.01	2.93	499	95	40	12
	2.42	1.08	503	101	41	17
	4.93	1.04	450	182	18	14
II	1.00	3.56	501	66	32	17
	3.00	1.10	501	66	19	12
	8.01	0.86	501	66	18	12
III	1.02	2.76	406	62	18	11
	3.02	1.07	406	62	7	5
	8.89	0.70	406	62	7	4
IV	1.00	3.49	336	18	42	14
	3.07	1.64	336	18	47	14
	9.87	0.55	330	12	30	9

TABLE 12. INFLUENT AND EFFLUENT TOC FOR COMBINED SYSTEMS

Combine System	SRT days	F/M	Influent BOD_5 mg/ℓ		Effluent BOD_5 mg/ℓ	
			mean	S.D.	mean	S.D.
I	1.01	0.85	134	24	32	12
	2.42	0.43	136	23	25	8
	4.93	0.34	135	24	30	10
II	1.00	1.04	154	28	33	8
	3.00	0.33	154	28	33	11
	8.01	0.26	154	28	29	8
III	1.02	1.36	190	35	24	7
	3.02	0.49	190	30	20	3
	8.89	0.31	186	37	17	4
IV	1.00	2.14	171	14	36	3
	3.07	0.68	171	14	34	19
	9.87	0.30	171	14	21	8

TABLE 13. EFFLUENT SOLIDS, SLUDGE VOLUME INDEX, AND OXYGEN UPTAKE RATE FOR COMBINED SYSTEMS

Combined Systems	SRT days	Effluent VSS, mean	mg/ℓ S.D.	SVI Range	O_2 Uptake mg/gm/hr
I	1.01	11	9	128-2382	30.4
	2.42	108	169	400-1562	10.8
	4.93	57	82	489-1122	15.4
II	1.00	43	41	86-2152	20.2
	3.00	7	5	124-1456	17.2
	8.01	50	61	472-624	12.5
III	1.02	8	14	144-1406	27.2
	3.02	3	8	664-952	15.6
	8.89	37	59	378-573	11.3
IV	1.00	15	9	143-1737	44.7
	3.07	11	9	137-1346	22.3
	9.87	11	10	76-100	8.2

TABLE 14. INFLUENT, EFFLUENT, AND SLUDGE CONCENTRATIONS OF SPECIFIC COMPOUNDS FOR COMBINED SYSTEMS

Combined System		SRT days	Influent μg/ℓ	Effluent μg/ℓ	Sludge μg/ℓ
I	Anthracene	1.01	68	≤10	≤10
	Dimethyl phthalate		5960	540	56
	Hexachloroethane		900	≤10	≤10
	Anthracene	2.42	68	≤10	≤10
	Dimethyl phthalate		5960	370	256
	Hexachloroethane		900	≤10	≤10
	Anthracene	4.93	68	≤10	≤10
	Dimethyl phthalate		5960	410	208
	Hexachloroethane		900	≤10	≤10
II	4-nitrophenol	1.00	13500	1990	--
	2,4,6 trichlorophenol		11960	330	2080
	1,2 dichloroethylene		9100	29	57
	4-nitrophenol	3.00	13500	600	--
	2,4, 6 trichlorophenol		11960	450	375
	1,2 dichloroethylene		9100	26	19
	4-nitrophenol	8.01	13500	1390	--
	2,4,6 trichlorophenol		11960	360	230
	1,2 dichloroethylene		9100	29	26
III	Fluroanthene	1.02	144	24	45
	2-chloronaphthalene		840	18	18
	Hydrazobenzene		1750	790	333
	Fluoranthene	3.02	144	16	45
	2-chloronaphthalene		841	18	36
	Hydrazobenzene		1750	710	462
	Fluoranthene	8.89	144	23	21
	2-chloronaphthalene		840	45	≤10
	Hydrazobenzene		1750	750	89
IV	Nickel	1.00	1.96	1.33	6.6
	Cadmium		1.49	0.41	8.7
	Chromium		1.87	0.98	18.3
	Nickel	3.07	1.96	1.49	5.1
	Cadmium		1.49	0.55	7.6
	Chromium		1.87	0.88	14.1
	Nickel	9.87	1.96	1.70	5.5
	Cadmium		1.49	0.58	8.5
	Chromium		1.87	1.51	7.9

principles governing the purification process. Most models are developed by writing material balances describing the mass rate of change in substrate and in biomass. Substrate utilization and biomass increase are the two major concerns in the functional design of the bioreactor. Describing mathematically these two functions is where the various models differ.

Figure 1 is a diagram of an activated sludge process including the bioreactor and the mixed liquor separator. If a mass balance for substrate is written around the entire process:

$$\text{Rate of change of substrate in reactor} = \text{Rate of substrate inflow to reactor} - \text{Rate of substrate outflow from reactor} - \text{Rate of substrate utilization}$$

$$\left(\frac{ds}{dt}\right)_R V = FS_i - FS_e - \left(\frac{ds}{dt}\right)_g V$$

For steady state conditions $\left(\frac{ds}{dt}\right)_g = 0$. Therefore

$$\left(\frac{ds}{dt}\right)_g V = FS_i - FS_e$$

The various models differ by the assumption for

$$\left(\frac{ds}{dt}\right)_g$$

Eckenfelder $$\left(\frac{ds}{dt}\right)_g = \frac{K_e' \times S_e}{S_i}$$

Lawrence and McCarty $$\left(\frac{ds}{dt}\right)_g = \frac{K \times S_e}{K_s + S_e}$$

Gaudy $$\left(\frac{ds}{dt}\right)_g = \frac{U_{max} \times S_e}{Y_t\,(K_s + S_e)}$$

Kincannon and Stover $$\left(\frac{ds}{dt}\right)_g = \frac{U_{max} \times \frac{FS_i}{xv}}{K_b + \frac{FS_i}{xv}}$$

Each model contains several biokinetic constants. These are:

K_e' - Eckenfelder's 2nd order substrate removal constant

K - Maximum substrate utilization rate (Lawrence & McCarty)

μ_{max} - Maximum specific growth rate (Gaudy)

K_s - Saturation constant (Lawrence & McCarty, Gaudy)

Y_t - True cell yield (all models)

k_d - Maintenance energy coefficient (all models)

U_{max} - Kincannon and Stover's maximum substrate utilization rate

K_b - Kincannon and Stover's saturation constant

These biokinetic constants were determined by linear regression analysis of the pilot plant data. The results are given in Tables 15-18. Table 15 provides the BOD_5 biokinetic constants for the single chemical systems. Table 16 provides the TOC biokinetic constants for the single chemical systems and Table 17 provides the COD biokinetic constants for the single chemical systems. Table 18 provides the BOD_5, TOC, and COD biokinetic constants for the combined systems. All biokinetic constants are mean constants. The graphical procedures for determining the biokinetic constants are outlined in the original report "Determination of Activated Sludge Biokinetic Constants for Chemical and Plastic Industrial Wastewaters," EPA-600/2-83-073a.

The linear regression analysis for determination of Y_t, k_d, U_{max}, and K_b gave results with very acceptable correlation coefficients. The linear regression analysis for K, μ_{max}, and K_s were so poor that the biokinetic constants determined by the analysis have very little use. Eckenfelder's constant, K_e', also showed poor correlation. However, the constants do appear to give a good mean value. They are usable if one recognizes the high variability and uses them accordingly.

The biokinetic constants, K_e' and U_{max}, can be used to assess the effect of the various chemicals on the biological systems. Table 15 shows that K_e' for the control system was 71 day^{-1}, and U_{max} for the control system was 100 lbs BOD/day/lb solids. The systems fed 2,4,6 trichlorophenol, nickel, cadmium, and chromium all had kinetic constants less than these. Whereas, the other systems show constants equal to or greater than the control constants. It can also be seen in Table 4 that, in general, these systems also had higher effluent BOD's. Table 18 shows that the combined system containing the metals had a detrimental effect on the system; whereas, the other combined systems showed no detrimental effect. It is also seen in Table 10 that combined system IV had higher effluent BOD's than the other combined systems.

TABLE 15. BOD$_5$ BIOKINETIC CONSTANTS FOR SINGLE CHEMICAL SYSTEMS

Compound	Y_t	k_d day^{-1}	μ_{max} day^{-1}	K day^{-1}	K_s mg/ℓ	K_e' day^{-1}	U_{max} lbs/day/lb	K_b lb/day/lb
Anthracene	0.41	0.16	0.60	0.03	0.08	162	100	101
Dimethyl Phthalate	0.41	0.07	0.48	0.05	0.10	105	100	101
Hexachloroethane	0.35	0.16	0.57	0.85	2.00	106	100	100
1,2-dichloroethylene	0.51	0.03	0.33	0.78	2.34	80	100	101
4-nitrophenol	0.49	0.00	0.55	1.64	4.92	94	100	101
2,4,6 trichlorophenol	0.46	0.02	0.41	1.03	3.09	54	50	50
Fluoranthene	0.35	0.04	0.50	1.27	3.80	102	100	101
2-chloronapthalene	0.55	0.01	0.24	0.64	1.92	91	100	100
Hydrazobenzene	0.54	0.04	0.28	0.61	1.82	80	100	100
Nickel	0.43	0.03	0.55	1.00	3.00	53	50	50
Cadmium	0.43	0.06	1.00	2.13	5.14	70	50	50
Chromium	0.46	0.01	0.38	0.93	1.54	41	50	50
Control	0.46	0.09	3.00	6.50	22.00	71	100	100

TABLE 16. TOC BIOKINETIC CONSTANTS FOR SINGLE CHEMICAL SYSTEMS

Compound	Y_t	k_d day^{-1}	μ_{max} day^{-1}	K day^{-1}	K_s mg/ℓ	K_e' day^{-1}	U_{max} lbs/day/lb	K_b lbs/day/lb
Anthracene	0.85	0.32	0.87	0.24	2.66	1.81	14.3	20.1
Dimethyl Phthalate	0.89	0.16	0.65	0.35	2.11	2.55	14.3	17.9
Hexachloroethane	0.91	0.18	0.54	0.21	0.10	1.85	14.3	18.4
1,2-dichloroethylene	1.39	0.04	--	--	--	1.67	12.7	13.7
4-nitrophenol	1.26	0.03	1.13	0.37	--	2.52	10.0	12.7
2,4,6 trichlorophenol	1.45	0.01	0.41	0.31	8.67	1.60	10.0	12.7
Fluoranthene	0.61	0.03	0.34	0.53	3.90	6.02	9.0	9.8
2-chloronaphthalene	0.79	0.02	0.65	0.74	24.80	6.93	21.2	22.8
Hydrazobenzene	0.74	0.01	--	25.0	--	5.97	16.7	18.2
Nickel	0.67	0.05	0.40	0.57	3.96	5.33	7.7	8.2
Cadmium	0.96	0.20	0.53	0.56	0.49	5.59	5.9	6.1
Chromium	0.67	0.01	0.27	0.47	1.31	4.54	6.3	6.7
Control	0.86	0.10	4.30	5.0	154	5.50	--	--

TABLE 17. COD BIOKINETIC CONSTANTS FOR SINGLE CHEMICAL SYSTEMS

Compound	Y_t	k_d days^{-1}	μ_{max} day^{-1}	K day^{-1}	K_s mg/ℓ	K_e' day^{-1}	U_{max} lbs/day/lb	K_b lbs/day/lb
Anthracene	0.24	0.30	0.95	1.67	5.85	18	25	26
Dimethyl Phthalate	0.20	0.19	0.71	1.82	4.73	27	100	108
Hexachloroethane	0.26	0.09	0.47	1.33	1.67	21	100	108
1,2-dichloroethylene	--	--	2.04	0.90	0.71	21	71	76
4-nitrophenol	0.18	0.19	0.74	1.82	7.80	33	50	52
2,4,6 trichlorophenol	0.35	0.04	0.43	1.45	7.46	24	100	107
Fluoranthene	0.22	0.07	0.36	0.88	0.04	58	50	50
2-chloronaphthalene	0.26	0.08	0.39	1.09	0.11	51	100	101
Hydrazobenzene	0.37	0.04	0.29	0.93	0.12	33	50	51
Nickel	0.29	0.08	1.09	4.76	61	14	25	27
Cadmium	0.42	0.10	--	--	--	9	20	22
Chromium	0.31	0.11	0.49	0.68	7.77	13	100	110
Control	0.28	0.07	1.90	6.7	140	20	--	--

TABLE 18. BIOKINETIC CONSTANTS FOR COMBINED SYSTEMS

Combined Systems	Y_t	k_d days^{-1}	μ_{max} day^{-1}	K day^{-1}	K_s mg/ℓ	K_e day^{-1}	U_{max} lbs/day/lb	K_b lb/day/lb
				BOD				
I	0.40	0.18	0.61	0.80	0.03	92	100	102
II	0.40	0.02	0.38	1.03	0.71	85	100	101
III	0.50	0.01	0.31	0.72	0.39	106	100	101
IV	0.24	0.16	0.74	1.81	4.37	27	25	25
				TOC				
I	0.91	0.26	--	--	--	2.05	12.3	15.6
II	0.94	0.08	0.65	0.31	21.56	2.15	20.0	25.0
III	0.61	0.10	2.44	0.65	100	6.31	27.0	29.2
IV	0.47	0.10	0.70	0.73	21.80	4.61	6.3	7.0
				COD				
I	0.26	0.09	0.47	1.33	1.67	21.4	100	108
II	0.29	0.03	0.32	1.43	1.45	38.9	50	51
III	0.33	0.01	0.27	1.05	--	55.7	100	101
IV	0.09	0.32	1.02	1.72	21.0	14.6	20	22

FATE OF SPECIFIC CHEMICALS

The removal mechanism for each specific chemical during biological treatment by the activated sludge process was determined. Stripping was determined by measuring the off-gases. Sorption was determined by 24-hours continuous solvent extraction or by purging sludge samples. Biological degradation was assumed to account for the rest of the removal. The percent treatment achieved by each mechanism for the single chemical systems is shown in Table 19, and the percent treatment achieved by each mechanism for the combined systems is shown in Table 20. It is seen that 1,2-dichloroethylene was the only chemical removed by stripping. However, the removal was not solely by stripping. Biological removal of 1,2-dichloroethylene also occurred. In the single chemical systems, 37 percent of the 1,2-dichloroethylene was stripped; however, when combined with 4-nitrophenol and 2,4,6-trichlorophenol, 62 percent was stripped.

Only four organic chemicals were removed by sorption in the single chemical systems; these being, hydrazobenzene, 2,4,6-trichlorophenol, anthracene, and hexachloroethane. The chemical 4-nitrophenol was probably removed by sorption but problems with analysis of the sludge prevented determining whether this was true or not. In the combined systems, these compounds responded in a slightly different manner with different levels of sorption being observed. This probably was due to the problem associated with measuring the small quantities that were sorbed. Also, sorption capabilities of certain chemicals may be changed when in the presence of other chemicals.

It is seen that the only removal mechanism for the metals was sorption. Similar levels of removal were observed in both the single and combined systems.

It was also found that all of the organic chemicals were biodegraded to some degree. Kincannon and Stover (1-5) have previously reported this with other organic priority pollutants. This shows that biological treatment is an effective treatment process for organic priority pollutants.

The effluent concentrations for the chemicals that were achieved by the treatment process are shown in Table 21. This data shows that, when biological treatment is the major mechanism of removal, the effluent concentrations achieved are lower than those achieved by other removal mechanisms. Sorption seems to be the most inefficient removal mechanism.

TABLE 19. REMOVAL MECHANISMS FOR SPECIFIC CHEMICALS IN SINGLE SYSTEMS

Chemical	PERCENT TREATMENT ACHIEVED			
	Stripping	Sorption	Biological	Total
Phthalates				
Dimethyl	0	0	99.5	99.5
Nitrogen Compound				
Hydrazobenzene	0	0.3	38.1	38.4
Phenols				
4-Nitro	0	93.1*		93.1
2,4,6-Trichloro		4.2	74.4	78.6
Polynuclear Aromatics				
Anthracene	0	8.7	14.6	23.3
Fluoranthene	0	0	80.6	80.6
2-Chloronaphthalene	0	0	98.3	98.3
Halogenated Hydrocarbons				
Hexachloroethane	0	0.4	87.1	87.5
1,2 dichloroethylene	37.0	0	62.0	99.0
Metals				
Nickel	0	23.1	0	23.1
Cadmium	0	67.7	0	67.7
Chromium	0	60.8	0	60.8

* 4-nitrophenol was removed by sorption and biological means both, but mechanisms could not be separated.

TABLE 20. REMOVAL MECHANISMS FOR SPECIFIC CHEMICALS IN COMBINED SYSTEMS

Chemical	PERCENT TREATMENT ACHIEVED			
	Stripping	Sorption	Biological	Total
Phthalates				
Dimethyl	0	0.6	92.0	92.6
Nitrogen Compounds				
Hydrazobenzene	0	3.7	53.4	57.1
Phenols				
4-nitro	0	90.2		90.2
2,4,6-trichloro	0	2.7	94.1	96.8
Polynuclear Aromatics				
Anthracene	0	0	85.3	85.3
Fluoranthene	0	3.8	81.6	85.4
2-chloronaphthalene	0	0.4	96.4	96.8
Halogenated Hydrocarbons				
Hexachloroethane	0	0	98.8	98.8
1,2 dichloroethylene	62.1	0	37.6	99.7
Metals				
Nickel	0	23.0	0	23.0
Cadmium	0	65.8	0	65.8
Chromium	0	40.1	0	40.1

TABLE 21. EFFLUENT ACHIEVED FOR SPECIFIC CHEMICAL

Chemical	Influent µg/ℓ	Effluent Achieved, µg/ℓ			
		Biological	Sorption	Biological plus Stripping	Biological plus Sorption
Phthalates					
Dimethyl	37250	197			
Nitrogen Compound					
Hydrazobenzene	4180				2573
Phenols					
4-nitro	32300				2217
2,4,6 trichloro	14830				1283
Polynuclear Aromatics					
Anthracene	63				48
Fluoranthene	134	26			
2-chloronaphthalene	2020	35			
Halogenated Hydrocarbons					
Hexachloroethane	3720				391
1,2 dichloroethylene	29200			278	
Metals					
Nickel	3860		3059		
Cadmium	3680		1187		
Chromium	3570		1080		

REFERENCES

1. Kincannon, Don F. and Enos L. Stover. Biological Treatability of Specific Organic Compounds Found in Chemical Industry Wastewaters. Proceedings 36th Annual Purdue Industrial Waste Conference, West Lafayette, Indiana, 1981.

2. Kincannon, Don F. and Enos L. Stover. Fate of Organic Compounds During Biological Treatment. Proceedings National Conference on Environmental Engineering, ASCE, Atlanta, Georgia, 1981.

3. Kincannon, Don F., Enos L. Stover, Virgil Nichols, and David Medley. Removal Mechanisms for Biodegradable and Non-Biodegradable Toxic Priority Pollutants in Industrial Wastewaters. Proceedings, Industrial Wastes Session, 54th Annual Water Pollution Control Federation Conference, Detroit, Michigan, 1981.

4. Kincannon, Don F., Enos L. Stover and Yu-Ping Chung. Biological Treatment of Organic Compounds Found in Industrial Aqueous Effluents. Presented at American Chemical Society National Meeting, Atlanta, Georgia, 1981.

5. Kincannon, Don F. and Enos L. Stover. Stripping Characteristics of Priority Pollutants During Biological Treatment. Presented at Secondary Emissions Session of the 74th Annual American Institute of Chemical Engineers Meeting, New Orleans, Louisiana, 1981.

APPENDIX

This appendix provides the raw data collected during this study. It is provided so that others interested in the treatment of wastewaters containing priority pollutants may have the opportunity of conducting additional analysis of the data if they so desire.

```
--------------------------------------------------------------------------------

   COMPOUND =ANTHRACENE                    THETA C = 1

   PARAMETER =BOD                          VOLUME-REACTOR = 3.13

-----------------------------------------------------------------------------------
   DATE     SI     SE       F     FW      X      XE     FSI    F(SI-SE)   TC
   1982                                                  XV       XV
-----------------------------------------------------------------------------------

   11/01   202     0.8    9.50   3.13    390      0    1.572    1.566     1.00
   11/03   259     4.5    9.36   3.13    590      0    1.313    1.290     1.00
   11/05   254    12.5    9.36   3.08    630     16    1.206    1.146     0.97
   11/08   276     4.6    9.65   3.10    400      2    2.127    2.092     1.00
   11/10   278     0.9    9.07   3.10    470      2    1.714    1.708     1.00
   11/12   276     0.7    8.93   3.13    730      0    1.079    1.076     1.00
   11/15   305     1.3    9.36   3.10    370      2    2.465    2.455     1.00
   11/17   306     1.7    9.50   3.09    343      4    2.708    2.693     0.99
   11/19   349    11.0    9.36   3.00    336      8    3.106    3.008     0.99
   11/24   207     0.0    9.65   2.98    623     14    1.024    1.024     1.00
   11/29   337     2.1    9.65   3.13    885      0    1.174    1.167     1.00
   12/01   334     2.0    8.93   3.10   1047      2    0.910    0.905     1.01
   12/03   263     0.8    9.65   3.04    948     14    0.855    0.853     1.00
   12/06   256     1.7    9.22   3.04    425      7    1.774    1.763     1.00
   12/08   238     2.0    9.50   3.05    458      6    1.577    1.564     1.00
   12/10   249     0.5    9.50   2.95    427     13    1.770    1.766     0.99
   12/13   339     1.3    9.36   1.70    428     82    2.369    2.359     0.99
   12/15   335     1.5    6.48   0.00    416    258    1.667    1.660     0.78
   12/17   268     3.0    9.22   0.00    183     98    4.314    4.266     0.63
   12/20   271     5.5    9.22   2.90    353     13    2.261    2.216     1.00
   12/22   285     1.9    8.93   0.30    390      7    2.085    2.071     6.88
   12/24   299     1.8    9.36   3.13    262      0    3.413    3.392     1.00
   12/27   279     0.3    8.93   2.60    306     26    2.601    2.599     1.00
   12/29   366     1.9    8.93   3.04    530      8    1.970    1.960     1.00

   MEAN    273     2.6    8.82   2.51    478     23    1.882    1.864     1.17
   S.DEV 70.75    3.09    1.93   1.12  234.91   54.5    .91      .9       1.2
   C V % 25.8    120.2    21.9   44.7   49.1   234.1   48.8     48.7     103.4
-----------------------------------------------------------------------------------
```

COMPOUND =ANTHRACENE THETA C = 3

PARAMETER =BOD VOLUME-REACTOR = 3.14

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	202	0.5	9.36	1.04	830	0	0.725	0.724	3.02
11/03	259	2.7	9.65	0.90	940	20	0.847	0.838	2.89
11/05	254	12.5	9.22	1.03	1040	2	0.717	0.682	3.00
11/08	276	0.6	9.50	1.04	970	0	0.861	0.859	3.02
11/10	278	0.4	9.36	1.02	940	2	0.882	0.880	3.03
11/12	276	1.1	9.36	0.00	860	114	0.957	0.953	2.53
11/15	305	0.0	9.65	0.00	295	180	3.177	3.177	0.53
11/17	306	1.1	9.36	0.00	410	150	2.225	2.217	0.92
11/19	319	1.6	9.36	0.00	719	349	1.323	1.316	0.69
11/22	295	1.3	9.50	0.00	568	555	1.571	1.564	0.34
11/24	207	0.0	9.65	0.65	997	44	0.638	0.638	3.00
11/26	287	1.8	9.36	0.00	645	262	1.326	1.318	0.83
11/29	337	0.3	9.14	0.00	865	102	1.134	1.133	2.91
12/01	334	0.6	9.22	0.37	841	80	1.166	1.164	2.59
12/03	263	0.4	9.36	1.00	1260	20	0.622	0.621	2.77
12/06	256	1.5	9.36	0.70	1864	80	0.409	0.407	2.93
12/08	238	4.3	9.65	1.00	2250	8	0.325	0.319	3.05
12/10	249	0.2	9.65	0.95	2013	24	0.380	0.380	2.98
12/13	339	0.6	9.50	0.00	1065	294	0.963	0.961	1.20
12/15	355	0.6	6.19	0.00	975	247	0.718	0.717	2.00
12/20	271	3.3	9.65	0.90	741	11	1.124	1.110	3.05
12/22	285	2.0	8.64	0.22	654	64	1.199	1.191	3.01
12/27	279	1.4	9.65	0.00	1274	201	0.673	0.670	2.06
MEAN	281	1.7	9.28	0.47	1001	122	1.042	1.036	2.28
S.DEV	39.65	2.59	.71	.46	477.1	141.73	.62	.62	.97
C V %	14	153.6	7.6	99.2	47.6	116	60.3	60.7	43

COMPOUND =ANTHRACENE THETA C = 6

PARAMETER =BOD VOLUME-REACTOR = 3.1

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	202	0.7	9.65	0.52	1930	0	0.326	0.325	5.96
11/03	259	6.4	9.79	0.52	1660	0	0.493	0.481	5.96
11/05	254	13.0	9.07	0.50	1650	4	0.450	0.427	5.95
11/08	276	1.5	8.93	0.50	1640	4	0.485	0.482	5.96
11/10	278	0.7	9.50	0.00	1500	168	0.568	0.567	2.91
11/12	276	0.7	8.93	0.34	1670	34	0.476	0.475	6.02
11/15	305	0.0	8.93	0.52	1800	0	0.488	0.488	5.96
11/17	306	1.3	9.36	0.52	1778	0	0.520	0.517	5.96
11/19	319	1.6	9.65	0.52	2861	0	0.347	0.345	5.96
11/22	295	1.2	9.22	0.49	2067	6	0.424	0.423	6.02
11/24	207	1.6	9.22	0.40	1980	21	0.311	0.309	6.28
11/26	287	0.6	9.07	0.37	1886	37	0.445	0.444	5.73
11/29	337	1.5	9.07	0.00	1551	392	0.636	0.633	1.35
12/01	334	0.1	8.78	0.39	1444	19	0.655	0.655	6.20
12/08	238	1.4	8.93	0.00	398	115	1.723	1.712	1.20
12/10	249	1.2	9.65	0.05	1103	54	0.703	0.699	5.96
12/13	339	3.9	9.22	0.39	979	14	1.030	1.018	6.00
12/15	355	0.8	5.90	0.42	1180	20	0.573	0.571	6.04
12/17	268	1.4	9.36	0.07	1333	64	0.607	0.604	6.01
12/20	271	1.9	9.36	0.32	1283	27	0.638	0.633	6.08
12/22	285	3.3	8.78	0.50	1313	3	0.615	0.608	5.97
12/24	299	1.0	9.22	0.54	1523	0	0.584	0.582	5.74
12/27	279	1.4	5.90	0.24	1473	72	0.360	0.359	6.00
12/29	366	1.4	9.36	0.00	1150	296	0.961	0.957	1.29
MEAN	287	2.0	8.95	0.34	1548	56	0.601	0.596	5.27
S.DEV	41.98	2.69	.98	.2	463.07	98.62	.29	.29	1.66
C V %	14.6	132.9	10.9	59.9	29.9	175.3	49.2	49.3	31.6

```
----------------------------------------------------------------------------

     COMPOUND =ANTHRACENE               THETA C = 1

     PARAMETER =COD                     VOLUME-REACTOR = 3.13

--------------------------------------------------------------------------------
     DATE    SI     SE      F    FW     X     XE     FSI   F(SI-SE)  TC
     1982                                             XV     XV
--------------------------------------------------------------------------------

     11/05   550   28.0   9.36  3.08   630    16    2.611  2.478     0.97
     11/12   500   20.0   8.93  3.13   730     0    1.954  1.876     1.00
     11/19   390   86.0   9.36  3.00   336     8    3.471  2.706     0.99
     12/03   420   36.0   9.65  3.04   948    14    1.366  1.249     1.00
     12/10   410   37.0   9.50  2.95   427    13    2.914  2.651     0.99
     12/17   410   76.0   9.22  0.00   183    98    6.600  5.376     0.63
     12/24   455   18.0   9.36  3.13   262     0    5.193  4.988     1.00
     12/29   455   37.0   8.93  3.04   530     8    2.449  2.250     1.00

     MEAN    449   42.3   9.29  2.67   506    20    3.320  2.947     0.95
     S.DEV 53.76   25.16   .25   1.08  256.48  32.23  1.74  1.46       .12
     C V % 11.9    59.5    2.7   40.4  50.7  164.2  52.6   49.5      13.4

----------------------------------------------------------------------------
```

```
----------------------------------------------------------------------------

   COMPOUND =ANTHRACENE                      THETA C = 3

   PARAMETER =COD                            VOLUME-REACTOR = 3.14

---------------------------------------------------------------------------------
   DATE    SI      SE      F     FW      X      XE      FSI   F(SI-SE)  TC
   1982                                                  XV      XV
---------------------------------------------------------------------------------

   11/05   550    60.0   9.22  1.03   1040      2    1.553  1.383     3.00
   11/12   500    14.0   9.36  0.00    860    114    1.733  1.685     2.53
   11/19   390    29.0   9.36  0.00    719    349    1.617  1.497     0.69
   11/26   360    72.0   9.36  0.00    645    262    1.664  1.331     0.83
   12/03   420    46.0   9.36  1.00   1260     20    0.994  0.885     2.77
   12/10   410    30.0   9.65  0.95   2013     24    0.626  0.580     2.98
   12/17   410    90.0   9.65  0.00    629    381    2.003  1.563     0.54

   MEAN    380    42.6   8.25  0.37    896    144    1.274  1.116     1.67
   S.DEV 165.44   30.24   3.33  .51  581.94  161.99  .67    .58      1.26
   C V % 43.5     70.9    40.4  138.1  64.9  112.4  53.1  52.1       75.8
----------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND =ANTHRACENE                  THETA C = 6

     PARAMETER =COD                        VOLUME-REACTOR = 3.1

-----------------------------------------------------------------------------------
     DATE    SI      SE      F    FW      X      XE      FSI   F(SI-SE)  TC
     1982                                                 XV      XV
-----------------------------------------------------------------------------------

     11/05   550    81.0   9.07  0.50  1165      4     1.381  1.178     5.86
     11/12   500    66.0   8.93  0.34  1670     34     0.862  0.749     6.02
     11/19   390     8.0   9.65  0.52  2624      0     0.463  0.453     5.96
     11/26   360    27.0   9.07  0.35  1886     37     0.558  0.517     5.95
     12/10   410    39.0   9.65  0.05  1103     54     1.157  1.047     5.96
     12/17   410    38.0   9.36  0.07  1333     64     0.929  0.843     6.01
     12/24   455    10.0   9.22  0.54  1523      0     0.889  0.869     5.74
     12/29   455    14.0   9.36  0.00  1150    296     1.195  1.158     1.29

     MEAN    441    35.4   9.29  0.30  1557     61     0.929  0.852     5.35
     S.DEV 61.91    26.61   .26   .22  512.17  98.03   .31     .27       1.64
     C V % 14       75.2   2.8   76    32.9   160.3   33.7   32        30.7

-------------------------------------------------------------------------------
```

COMPOUND =ANTHRACENE THETA C = 1

PARAMETER =TOC VOLUME-REACTOR = 3.13

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/08	128	40.0	9.65	3.10	400	2	0.987	0.678	1.00
11/10	116	48.0	9.07	3.10	470	2	0.715	0.419	1.00
11/12	122	51.0	8.93	3.13	730	0	0.477	0.277	1.00
11/15	93	33.0	9.36	3.10	370	2	0.748	0.481	1.00
11/17	94	28.0	9.50	3.09	343	4	0.832	0.584	0.99
11/24	110	31.0	9.65	2.98	623	14	0.544	0.391	1.00
11/29	158	50.0	9.65	3.13	885	0	0.550	0.376	1.00
12/01	128	36.0	8.93	3.10	1047	2	0.349	0.251	1.01
12/03	146	51.0	9.65	3.04	948	14	0.475	0.309	1.00
12/06	152	27.0	9.22	3.04	425	7	1.054	0.866	1.00
12/08	141	26.0	9.50	3.05	458	6	0.934	0.762	1.00
12/10	163	32.0	9.50	2.95	427	13	1.159	0.931	0.99
12/13	161	22.0	9.36	1.70	428	82	1.125	0.971	0.99
12/15	115	41.0	6.48	0.00	416	258	0.572	0.368	0.78
12/17	148	40.0	9.22	0.00	183	98	2.382	1.738	0.63
12/20	162	28.0	9.22	2.90	353	13	1.352	1.118	1.00
12/22	120	59.0	8.93	3.00	390	7	0.878	0.446	1.01
12/24	160	35.0	9.36	3.13	262	0	1.826	1.427	1.00
12/27	120	48.0	8.93	2.60	306	26	1.119	0.671	1.00
12/29	124	45.0	8.93	3.04	530	8	0.668	0.425	1.00
MEAN	133	38.6	9.15	2.66	500	28	0.937	0.675	0.97
S.DEV	22.46	10.32	.68	.96	232.03	60.24	.49	.4	.09
C V %	16.8	26.7	7.4	36.2	46.4	215.9	52.3	59.4	9.5

COMPOUND =ANTHRACENE THETA C = 3

PARAMETER =TOC VOLUME-REACTOR = 3.14

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/08	128	40.0	9.50	1.04	970	0	0.399	0.274	3.02
11/10	116	43.0	9.36	1.02	940	2	0.368	0.231	3.03
11/12	122	53.0	9.36	0.00	860	114	0.423	0.239	2.53
11/15	93	20.0	9.65	0.00	295	180	0.964	0.755	0.53
11/17	94	22.0	9.36	0.00	410	150	0.683	0.523	0.92
11/22	85	27.0	9.50	0.00	568	555	0.453	0.309	0.34
11/24	110	27.0	9.65	0.65	977	44	0.346	0.261	2.98
11/29	158	22.0	9.14	0.00	865	102	0.532	0.458	2.91
12/01	128	28.0	9.22	0.37	841	80	0.447	0.349	2.59
12/03	146	17.0	9.36	1.00	1260	20	0.345	0.305	2.77
12/06	152	20.0	9.36	0.70	1864	80	0.243	0.211	2.93
12/08	141	25.0	9.65	1.00	2250	8	0.193	0.158	3.05
12/10	163	19.0	9.65	0.95	2013	24	0.249	0.220	2.98
12/13	161	12.0	9.50	0.00	1065	294	0.457	0.423	1.20
12/15	115	35.0	6.19	0.00	975	247	0.233	0.162	2.00
12/17	148	41.0	9.65	0.00	629	381	0.723	0.523	0.54
12/20	162	40.0	9.65	0.90	741	11	0.672	0.506	3.03
12/22	120	44.0	8.64	0.22	654	64	0.505	0.320	3.01
12/27	120	32.0	9.65	0.00	1274	201	0.289	0.212	2.06
MEAN	130	29.8	9.27	0.41	1024	135	0.449	0.339	2.23
S.DEV	24.56	11.13	.78	.45	521.55	148.17	.19	.15	.99
C V %	18.9	37.3	8.4	109.5	50.9	110.1	44.1	45.8	44.7

```
---------------------------------------------------------------------------

    COMPOUND =ANTHRACENE                    THETA C = 6

    PARAMETER =TOC                          VOLUME-REACTOR = 3.1

-------------------------------------------------------------------------------
    DATE    SI     SE      F     FW     X      XE      FSI    F(SI-SE)  TC
    1982                                                XV       XV
-------------------------------------------------------------------------------

    11/08   128   43.0   8.93   0.50   1640      4    0.225   0.149    5.96
    11/10   116   47.0   9.50   0.00   1500    168    0.237   0.141    2.91
    11/12   122   52.5   8.93   0.34   1670     34    0.210   0.120    6.02
    11/15    93   31.0   8.93   0.52   1800      0    0.148   0.098    5.96
    11/17    94   28.0   9.36   0.52   1778      0    0.160   0.112    5.96
    11/22    85   31.0   9.22   0.49   2067      6    0.122   0.078    6.02
    11/24   110   25.0   9.22   0.40   1980     21    0.165   0.128    6.28
    11/26   123   18.0   9.07   0.37   1880     37    0.191   0.163    5.73
    11/29   158    9.0   9.07   0.00   1551    392    0.298   0.281    1.35
    12/01   128   17.0   8.78   0.39   1444     19    0.251   0.218    6.20
    12/08   141   15.0   8.93   0.00    398    115    1.021   0.912    1.20
    12/10   163   23.0   9.65   0.05   1103     54    0.460   0.395    5.96
    12/13   161   18.0   9.22   0.39    979     14    0.489   0.434    6.00
    12/15   115   19.0   5.90   0.42   1180     20    0.185   0.155    6.04
    12/17   148   16.0   9.36   0.07   1335     64    0.335   0.299    6.02
    12/20   162   44.0   9.36   0.32   1283     27    0.381   0.278    6.08
    12/22   120   35.0   8.78   0.50   1313      3    0.259   0.183    5.97
    12/24   160   12.0   9.22   0.54   1523      0    0.312   0.289    5.74
    12/27   120   38.0   5.90   0.24   1473     72    0.155   0.106    6.00
    12/29   124   10.0   9.36   0.00   1150    296    0.326   0.299    1.29

   MEAN     129   26.6   8.83   0.30   1452     67    0.297   0.242    5.13
   S.DEV  24.13  13.09   1.03    .2  387.38 104.89    .19      .18     1.8
   C V %   18.7   49.2   11.6   67.5   26.6  155.8   66.9     77.5     35
---------------------------------------------------------------------------
```

COMPOUND =DIMETHYL PHTHALATE   THETA C = 1

PARAMETER =BOD   VOLUME-REACTOR = 3.1

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	180	5.8	9.50	2.96	410	9	1.345	1.302	1.00
11/03	244	11.9	9.50	2.80	430	19	1.739	1.654	1.00
11/05	262	7.5	9.50	2.97	450	9	1.784	1.733	1.00
11/08	286	6.1	9.50	2.99	520	9	1.685	1.650	1.00
11/12	315	5.0	9.50	3.08	530	2	1.821	1.792	1.00
11/15	360	3.3	9.50	2.89	500	16	2.206	2.186	1.00
11/17	331	3.2	9.50	2.91	630	18	1.610	1.595	1.00
11/19	366	1.0	9.22	2.97	490	10	2.222	2.215	1.00
11/22	336	4.0	9.36	2.95	600	14	1.691	1.671	1.00
11/24	290	2.9	9.50	2.95	960	22	0.926	0.916	1.00
11/26	285	3.2	9.50	2.95	520	12	1.680	1.661	1.00
11/29	324	2.1	9.50	2.64	480	32	2.069	2.055	1.00
12/01	364	6.9	9.50	2.76	560	28	1.992	1.954	1.00
12/03	314	3.3	9.50	2.72	570	32	1.688	1.670	1.00
12/06	295	6.7	9.50	2.43	420	40	2.152	2.104	1.00
12/08	327	9.0	8.06	2.84	570	28	1.492	1.451	1.00
12/10	270	7.5	9.50	2.39	400	40	2.069	2.011	1.00
12/13	345	18.8	9.50	2.57	470	36	2.249	2.127	1.00
12/15	411	19.5	9.22	2.61	430	32	2.843	2.708	1.00
12/17	329	11.9	9.22	2.66	480	32	2.039	1.965	1.00
12/20	312	7.2	9.50	2.47	400	36	2.390	2.335	1.00
12/22	300	2.1	9.50	2.59	350	26	2.627	2.608	1.00
12/24	310	0.0	9.50	3.10	419	0	2.267	2.267	1.00
12/27	306	0.6	9.50	2.70	408	15	2.298	2.294	1.05
12/29	352	3.7	9.50	3.02	281	2	3.839	3.798	1.01
MEAN	313	6.1	9.40	2.80	491	21	2.029	1.989	1.00
S.DEV	45.95	5	.29	.2	126.77	12.41	.55	.55	.01
C V %	14.7	81.7	3.1	7.4	25.8	59.7	27.5	27.7	1

COMPOUND =DIMETHYL PHTHALATE THETA C = 3

PARAMETER =BOD VOLUME-REACTOR = 3.1

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	180	1.6	9.22	0.34	690	54	0.776	0.769	3.00
11/03	244	7.5	9.22	0.34	880	69	0.825	0.799	2.99
11/05	262	12.9	9.22	0.00	540	81	1.443	1.372	2.24
11/08	286	5.3	9.22	0.00	720	110	1.181	1.160	2.20
11/12	315	1.0	9.22	0.99	790	4	1.186	1.182	3.00
11/15	360	2.6	9.22	0.82	1100	28	0.973	0.966	3.00
11/17	331	1.1	9.22	0.90	1280	20	0.769	0.767	3.01
11/19	366	0.2	8.93	0.97	1350	10	0.781	0.781	3.01
11/22	336	0.3	9.07	0.97	1710	14	0.575	0.574	2.99
11/24	290	0.1	9.22	0.98	1680	10	0.513	0.513	3.01
11/26	285	1.4	9.22	0.80	1470	40	0.577	0.574	3.01
11/29	324	0.2	9.22	0.91	1320	20	0.730	0.730	2.99
12/01	364	0.2	9.22	0.95	1130	12	0.958	0.958	2.99
12/03	314	0.4	9.22	0.00	1200	224	0.778	0.777	1.80
12/06	295	4.6	9.22	0.00	900	380	0.975	0.960	0.80
12/08	327	1.4	8.35	0.84	1270	32	0.694	0.691	3.01
12/13	345	2.2	9.22	0.35	1500	116	0.684	0.680	2.99
12/15	411	3.1	9.22	0.41	1470	104	0.832	0.825	3.00
12/17	329	2.5	9.22	0.42	1310	92	0.747	0.741	2.99
12/20	312	3.5	9.22	0.71	1280	48	0.725	0.717	3.01
12/22	300	3.3	9.22	0.91	1110	16	0.804	0.795	3.01
12/24	310	0.9	9.22	1.03	986	0	0.935	0.932	3.01
12/27	306	0.6	9.22	0.87	1008	12	0.903	0.901	3.20
12/29	352	1.7	9.22	0.72	1023	26	1.023	1.018	3.31
MEAN	302	2.3	8.80	0.61	1109	61	0.815	0.807	2.70
S.DEV	77.36	2.87	1.84	.38	379.03	83.94	.26	.26	.77
C V %	25.6	122.6	20.9	62.4	34.1	137.8	32.9	32.2	28.6

COMPOUND =DIMETHYL PHTHALATE THETA C = 6

PARAMETER =BOD VOLUME-REACTOR = 3.3

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	180	1.6	9.79	0.40	1730	29	0.309	0.306	5.92
11/03	244	2.3	9.79	0.06	1000	360	0.724	0.717	0.94
11/05	262	12.2	9.79	0.37	1510	29	0.515	0.491	5.99
11/08	286	6.0	9.79	0.00	620	144	1.368	1.340	1.45
11/12	315	3.0	9.79	0.27	890	26	1.050	1.040	6.02
11/15	360	4.9	9.79	0.40	900	14	1.187	1.171	6.04
11/17	331	3.6	9.79	0.00	760	152	1.292	1.278	1.69
11/19	366	0.7	9.79	0.00	650	124	1.670	1.667	1.77
11/22	336	2.8	9.79	0.00	700	110	1.424	1.412	2.15
11/24	290	0.0	9.79	0.49	880	6	0.978	0.978	5.96
11/26	285	0.4	9.79	0.00	910	120	0.929	0.928	2.56
11/29	324	1.0	9.79	0.00	720	160	1.335	1.331	1.52
12/01	364	0.3	9.79	0.00	690	108	1.565	1.564	2.15
12/03	314	2.2	9.79	0.00	570	192	1.634	1.623	1.00
12/06	295	0.8	9.79	0.00	520	244	1.683	1.678	0.72
12/08	327	11.6	10.08	0.00	850	60	1.175	1.133	4.64
12/10	270	2.2	9.79	0.33	1030	24	0.778	0.771	6.00
12/13	345	2.9	9.79	0.25	1670	52	0.613	0.608	6.03
12/15	411	3.7	9.79	0.46	1270	12	0.960	0.951	6.02
12/17	329	3.1	9.79	0.46	1660	16	0.588	0.582	6.00
12/20	312	2.9	9.79	0.48	1680	12	0.551	0.546	6.04
12/22	300	3.2	9.79	0.47	1420	12	0.627	0.620	6.01
12/24	310	1.6	9.79	0.47	1490	9	0.617	0.614	6.27
12/27	306	0.5	9.79	0.46	1472	10	0.617	0.616	6.31
12/29	352	1.6	9.79	0.37	1806	24	0.578	0.576	6.66
MEAN	313	3.0	9.80	0.23	1096	82	0.991	0.982	4.23
S.DEV	45.95	3.04	.05	.21	425.44	89.43	.41	.41	2.25
C V %	14.7	101.5	.5	94	38.8	109.1	42.2	42.4	53.2

```
------------------------------------------------------------------------------

    COMPOUND =DIMETHYL PHTHALATE        THETA C = 1

    PARAMETER =COD                      VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
    DATE     SI     SE      F     FW      X      XE      FSI   F(SI-SE)  TC
    1982                                                  XV      XV
----------------------------------------------------------------------------------

    11/05    810    33.0   9.50  2.97    450      9    5.516  5.291    1.00
    11/12    420    66.0   9.50  3.08    530      2    2.428  2.047    1.00
    11/19    468    59.0   9.22  2.97    490     10    2.841  2.483    1.00
    11/26    450    72.0   9.50  2.95    520     12    2.652  2.228    1.00
    12/03    550    94.0   9.50  2.72    570     32    2.957  2.452    1.00
    12/10    490    53.0   9.50  2.39    400     40    3.754  3.348    1.00
    12/17    380    35.0   9.22  2.66    480     32    2.355  2.138    1.00
    12/24    475    28.0   9.50  3.10    419      0    3.474  3.269    1.00

    MEAN     505    55.0   9.43  2.86    482     17    3.247  2.907    1.00
    S.DEV 132.78    22.56   .12   .24  57.66  15.26    1.03   1.08       0
    C V % 26.2      41     1.3   8.5   11.9   89.1    31.9   37.2     0

------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND =DIMETHYL PHTHALATE        THETA C = 3

     PARAMETER =COD                      VOLUME-REACTOR = [illegible].1

-----------------------------------------------------------------------------------
     DATE    SI     SE      F    FW      X      XE      FSI   F(SI-SE)  TC
     1982                                                XV      XV
-----------------------------------------------------------------------------------

     11/05   810    37.0   9.22  0.00   540     81     4.461  4.258     2.24
     11/19   468     8.0   8.93  0.97  1350     10     0.999  0.982     3.01
     11/26   450    23.0   9.22  0.80  1470     40     0.910  0.864     3.01
     12/03   550    24.0   9.22  0.00  1200    224     1.363  1.304     1.80
     12/10   490    31.0   9.22  1.03  1500      0     0.972  0.910     3.01
     12/17   380    50.0   9.22  0.42  1310     92     0.863  0.749     2.99
     12/24   475    18.0   9.22  1.03   986      0     1.433  1.379     3.01

     MEAN    453    23.9   8.03  0.53  1045     56     1.375  1.306     2.38
     S.DEV 223.44   15.86   3.24  .48  524.46  77.39  1.32    1.26       1.06
     C V % 49.3     66.4    40.4  90.5  50.2  138.5  96      96.8      44.7

-------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------

     COMPOUND =DIMETHYL PHTHALATE        THETA C = 6

     PARAMETER =COD                      VOLUME-REACTOR = 3.3

------------------------------------------------------------------------------------
     DATE    SI      SE       F     FW      X      XE       FSI    F(SI-SE)  TC
     1982                                                    XV       XV
------------------------------------------------------------------------------------

     11/05   810    37.0    9.79  0.37   1510     29      1.591   1.519      5.99
     11/12   420    88.0    9.79  0.27    390     26      1.400   1.107      6.02
     11/19   468    24.0    9.79  0.00    650    124      2.136   2.026      1.77
     11/26   450    15.0    9.79  0.00    910    120      1.467   1.418      2.56
     12/03   550    43.0    9.79  0.00    570    192      2.863   2.639      1.00
     12/10   490    43.0    9.79  0.33   1030     24      1.411   1.287      6.00
     12/17   380    38.0    9.79  0.46   1660     16      0.679   0.611      6.00
     12/24   475    18.0    9.79  0.47   1490      9      0.946   0.910      6.27

     MEAN    505    38.3    9.79  0.24   1089     68      1.562   1.440      4.45
     S.DEV 132.78   22.91    0      .2  414.26   68.26    .68     .64        2.25
     C V % 26.2     59.9     0      87.1  38     101.1    43.5    44.6       50.6

--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------

   COMPOUND =DIMETHYL PHTHALATE        THETA C = 1

   PARAMETER =TOC                      VOLUME-REACTOR = 3.1

------------------------------------------------------------------------------
   DATE     SI      SE        F     FW       X       XE      FSI    F(SI-SE)  TC
   1982                                                       XV      XV
------------------------------------------------------------------------------

   11/08   130     49.5     9.50   2.99     520       9     0.766   0.474     1.00
   11/10   133     46.0     9.50   3.00    1060      16     0.385   0.252     1.00
   11/12   146     48.5     9.50   3.08     530       2     0.844   0.564     1.00
   11/15   106     31.0     9.50   2.89     500      16     0.650   0.460     1.00
   11/17   111     22.0     9.50   2.91     630      18     0.540   0.433     1.00
   11/19   107     36.0     9.22   2.97     490      10     0.649   0.431     1.00
   11/22   116     25.0     9.36   2.95     600      14     0.584   0.458     1.00
   11/24   110     21.0     9.50   2.95     960      22     0.351   0.284     1.00
   11/26   171     25.5     9.50   2.95     520      12     1.008   0.857     1.00
   11/29   171     30.0     9.50   2.64     480      32     1.092   0.900     1.00
   12/01   136      8.0     9.50   2.76     560      28     0.744   0.700     1.00
   12/03   169     30.0     9.50   2.72     570      32     0.909   0.747     1.00
   12/06   173     29.0     9.50   2.43     420      40     1.262   1.051     1.00
   12/08   154     47.0     8.06   2.84     570      28     0.702   0.488     1.00
   12/10   173     31.0     9.50   2.39     400      40     1.325   1.088     1.00
   12/13   128     22.0     9.50   2.57     470      36     0.835   0.691     1.00
   12/15   169     30.0     9.22   2.61     430      32     1.169   0.961     1.00
   12/17   143     32.0     9.22   2.66     480      32     0.886   0.688     1.00
   12/20   218     30.0     9.50   2.47     400      36     1.670   1.440     1.00
   12/22   184     58.0     9.50   2.59     350      26     1.611   1.103     1.00
   12/24   194     40.0     9.50   3.10     419       0     1.419   1.126     1.00
   12/27   148     31.0     9.50   2.70     408      15     1.112   0.879     1.05
   12/29   131     36.0     9.50   3.02     281       2     1.429   1.036     1.01

   MEAN    149     33.0     9.39   2.79     524      22     0.954   0.744     1.00
   S.DEV 30.31     11.21     .3     .21   174.86   12.47     .37     .31      .01
   C V % 20.3      33.9     3.2    7.7     33.3    57.6     39.1    42       1

--------------------------------------------------------------------------
```

COMPOUND =DIMETHYL PHTHALATE THETA C = 3

PARAMETER =TOC VOLUME-REACTOR = 3.1

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/08	130	48.0	9.22	0.00	720	110	0.537	0.339	2.20
11/10	133	46.0	9.22	0.83	1000	23	0.396	0.259	3.03
11/12	146	50.0	9.22	0.99	790	4	0.550	0.361	3.00
11/15	106	35.0	9.22	0.82	1100	28	0.287	0.192	3.00
11/17	111	29.0	9.22	0.90	1280	20	0.258	0.191	3.01
11/19	107	34.0	8.93	0.97	1350	10	0.228	0.156	3.01
11/22	116	24.0	9.07	0.97	1710	14	0.198	0.157	2.99
11/24	110	17.0	9.22	0.98	1680	10	0.195	0.165	3.01
11/26	171	16.5	9.22	0.80	1470	40	0.346	0.313	3.01
11/29	171	19.0	9.22	0.91	1320	20	0.385	0.342	2.99
12/01	136	15.5	9.22	0.95	1130	12	0.358	0.317	2.99
12/03	169	9.0	9.22	0.00	1200	224	0.419	0.397	1.80
12/06	173	17.0	9.22	0.00	900	380	0.572	0.516	0.80
12/08	154	9.0	8.35	0.84	1270	32	0.327	0.308	3.01
12/10	173	12.0	9.22	1.03	1500	0	0.343	0.319	3.01
12/13	128	22.0	9.22	0.35	1500	116	0.254	0.210	2.99
12/15	169	36.0	9.22	0.41	1470	104	0.342	0.269	3.00
12/17	143	19.0	9.22	0.42	1310	92	0.325	0.282	2.99
12/20	218	38.0	9.22	0.71	1280	48	0.507	0.418	3.01
12/22	184	5.0	9.22	0.91	1110	16	0.493	0.480	3.01
12/24	194	48.0	9.22	1.03	986	0	0.585	0.440	3.01
12/27	148	22.0	9.22	0.87	1008	12	0.437	0.372	3.20
12/29	131	13.0	9.22	0.72	1023	26	0.381	0.343	3.31
MEAN	149	25.4	9.16	0.71	1222	58	0.379	0.311	2.84
S.DEV	30.31	13.83	.18	.34	264.34	87.87	.11	.1	.54
C V %	20.3	54.5	2	47.7	21.6	150.7	31.1	32.7	19.1

```
----------------------------------------------------------------------------

     COMPOUND =DIMETHYL PHTHALATE       THETA C = 6

     PARAMETER =TOC                     VOLUME-REACTOR = 3.3


--------------------------------------------------------------------------------
     DATE    SI     SE      F    FW     X     XE     FSI   F(SI-SE)  TC
     1982                                             XV     XV
--------------------------------------------------------------------------------


     11/08   130   45.5   9.79  0.00   620   144    0.622  0.404     1.45
     11/10   133   61.0   9.79  0.00   780    69    0.506  0.274     3.81
     11/12   146   47.0   9.79  0.27   890    26    0.487  0.330     6.02
     11/15   106   32.0   9.79  0.40   900    14    0.349  0.244     6.04
     11/17   111   20.0   9.79  0.00   760   152    0.433  0.355     1.69
     11/19   107   33.0   9.79  0.00   650   124    0.488  0.338     1.77
     11/22   116   60.0   9.79  0.00   700   110    0.492  0.237     2.15
     11/24   110   19.0   9.79  0.49   880     6    0.371  0.307     5.96
     11/26   171   41.0   9.79  0.00   910   120    0.557  0.424     2.56
     11/29   171   25.5   9.79  0.00   720   160    0.705  0.600     1.52
     12/01   136   29.0   9.79  0.00   690   108    0.585  0.460     2.15
     12/03   169   15.0   9.79  0.00   570   192    0.880  0.802     1.00
     12/06   173   33.0   9.79  0.00   520   244    0.987  0.799     0.72
     12/08   154   11.0  10.08  0.00   850    60    0.553  0.514     4.64
     12/10   173   22.0   9.79  0.33  1030    24    0.498  0.435     6.00
     12/13   128   27.0   9.79  0.25  1670    52    0.227  0.179     6.03
     12/15   169   28.0   9.79  0.46  1270    12    0.395  0.329     6.02
     12/17   143   36.0   9.79  0.46  1660    16    0.256  0.191     6.00
     12/20   218   23.0   9.79  0.48  1680    12    0.385  0.344     6.04
     12/22   184   27.0   9.79  0.47  1420    12    0.384  0.328     6.01
     12/24   194    3.0   9.79  0.47  1490     9    0.386  0.380     6.27
     12/27   148   23.0   9.79  0.46  1472    10    0.298  0.252     6.31
     12/29   131   28.0   9.79  0.37  1806    24    0.215  0.169     6.66

     MEAN    149   30.0   9.80  0.21  1041    74    0.481  0.378     4.21
     S.DEV 30.31    14     .06   .21   415.12 69.97  .18    .16       2.18
     C V % 20.3    46.7     .6   101.8  39.8  94.6  39.4   44.9      51.9

----------------------------------------------------------------------------
```

COMPOUND =HEXACHLOROETHANE THETA C = 1

PARAMETER =BOD VOLUME-REACTOR = 3.17

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	205	11.0	9.50	2.83	379	18	1.621	1.534	1.01
11/03	245	12.2	9.50	2.50	395	36	1.859	1.766	1.01
11/05	219	11.5	9.50	2.94	555	18	1.183	1.120	1.01
11/08	319	11.2	9.40	3.10	300	0	3.153	3.042	1.02
11/10	322	3.1	9.50	3.00	310	6	3.113	3.083	1.01
11/12	322	6.2	9.50	3.10	386	4	2.500	2.452	1.00
11/15	355	10.0	9.50	3.10	260	3	4.092	3.977	1.00
11/17	357	8.4	9.50	3.10	771	0	1.388	1.355	1.02
11/19	362	2.1	9.50	3.10	894	0	1.213	1.206	1.02
11/22	302	3.0	9.50	3.17	1285	0	0.704	0.697	1.00
11/24	270	3.5	9.50	3.11	1296	12	0.624	0.616	1.00
11/26	234	1.7	9.50	2.96	1068	25	0.657	0.652	1.02
11/29	251	2.7	9.50	3.06	633	11	1.188	1.176	1.00
12/01	322	5.8	9.50	3.17	1257	0	0.768	0.754	1.00
12/03	239	1.2	9.50	3.17	971	0	0.738	0.734	1.00
12/06	245	1.6	9.50	3.01	501	12	1.466	1.456	1.00
12/08	218	2.6	9.50	3.00	447	12	1.462	1.444	1.00
12/10	221	2.2	9.50	2.45	322	33	2.057	2.036	1.00
12/13	330	5.2	9.50	2.95	437	15	2.263	2.227	1.00
12/15	307	4.6	9.50	2.96	314	10	2.930	2.886	1.00
12/17	298	4.5	9.50	3.05	561	10	1.592	1.568	1.00
12/20	240	2.4	9.50	1.55	480	98	1.498	1.483	1.00
12/22	249	6.2	9.50	0.89	325	86	2.296	2.239	1.00
12/24	266	2.0	9.50	3.17	490	0	1.627	1.615	1.00
12/27	268	1.8	9.50	2.97	482	15	1.666	1.655	1.00
12/29	261	2.5	9.50	3.05	323	6	2.422	2.398	1.00
MEAN	278	5.0	9.50	2.86	594	17	1.772	1.737	1.00
S.DEV	47.38	3.55	.01	.52	328.59	24.36	.87	.85	0
C V %	17	71.4	.2	18.3	55.3	147.3	49.5	49.2	.8

COMPOUND =HEXACHLOROETHANE THETA C = 3

PARAMETER =BOD VOLUME-REACTOR = 3.17

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	205	1.1	9.50	0.98	908	8	0.677	0.673	3.00
11/03	245	9.7	9.50	0.65	735	12	0.999	0.959	3.99
11/05	219	10.7	9.50	0.95	1026	34	0.640	0.608	2.57
11/08	319	5.1	9.50	1.00	1030	4	0.928	0.913	3.07
11/10	322	5.6	9.50	0.61	1170	59	0.825	0.810	3.00
11/12	322	1.4	9.50	0.56	1150	64	0.839	0.835	3.00
11/15	355	1.0	9.50	0.58	1210	66	0.879	0.877	2.97
11/17	357	0.7	9.50	1.00	1168	6	0.916	0.914	3.04
11/19	362	0.7	9.50	1.00	859	1	1.263	1.260	3.14
11/22	302	0.1	9.50	1.00	1092	0	0.829	0.829	3.17
11/24	270	5.0	9.50	0.95	1102	15	0.734	0.721	2.97
11/26	234	1.7	9.50	0.81	998	30	0.703	0.698	2.96
11/29	251	0.6	9.50	1.00	1488	6	0.506	0.504	3.06
12/01	322	1.0	9.50	1.00	995	6	0.970	0.967	3.02
12/03	239	1.0	9.50	1.04	848	2	0.845	0.841	2.99
12/06	245	0.9	9.50	0.20	885	98	0.830	0.827	2.58
12/08	218	1.5	9.50	0.20	823	149	0.794	0.788	1.68
12/10	221	6.9	9.50	0.57	760	41	0.871	0.844	3.01
12/13	330	2.2	9.50	0.10	310	130	3.190	3.169	0.78
12/15	307	1.6	9.50	0.88	437	9	2.105	2.094	3.00
12/17	298	1.5	9.50	1.05	891	0	1.002	0.997	3.02
12/20	240	3.3	9.50	0.05	542	466	1.327	1.309	0.39
12/22	249	3.0	9.50	1.05	676	0	1.104	1.091	3.02
12/24	266	0.3	9.50	1.05	810	0	0.984	0.983	3.02
12/27	268	0.6	9.50	0.97	1084	11	0.741	0.739	3.00
12/29	261	3.4	9.50	0.98	1316	11	0.594	0.587	3.02
MEAN	278	2.7	9.50	0.78	935	47	1.004	0.994	2.79
S.DEV	47.38	2.84	0	.32	265.28	94.74	.54	.53	.74
C V %	17	104.7	0	41.5	28.3	200.6	53.8	54.1	26.5

COMPOUND =HEXACHLOROETHANE   THETA C = 6

PARAMETER =BOD   VOLUME-REACTOR = 3.17

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/01	205	1.0	9.50	0.53	1430	0	0.430	0.428	5.98
11/03	245	0.9	9.50	0.48	1480	6	0.496	0.494	6.14
11/05	219	2.0	9.50	0.45	1300	11	0.505	0.500	6.02
11/08	319	2.4	9.50	0.47	1470	8	0.650	0.645	6.11
11/10	322	1.5	9.50	0.52	1658	1	0.582	0.579	6.03
11/12	322	0.1	9.50	0.51	1340	3	0.720	0.720	5.98
11/15	355	0.5	9.50	0.52	1700	0	0.626	0.625	6.10
11/17	357	0.9	9.50	0.45	977	8	1.095	1.092	6.05
11/19	362	0.5	9.50	0.51	1386	3	0.783	0.782	5.99
11/22	302	0.5	9.50	0.51	1496	2	0.605	0.604	6.07
11/24	270	1.5	9.50	0.53	1502	0	0.539	0.536	5.98
11/26	234	0.5	9.50	0.23	1197	38	0.586	0.585	6.05
11/29	251	0.3	9.50	0.52	2016	2	0.373	0.373	5.99
12/01	322	2.4	9.50	0.36	1404	25	0.687	0.682	6.06
12/03	239	0.6	9.50	0.53	1233	0	0.581	0.579	5.98
12/06	245	0.5	9.50	0.39	1680	24	0.437	0.436	6.09
12/08	218	1.9	9.50	0.27	1400	39	0.467	0.463	6.01
12/10	221	0.8	9.50	0.33	1705	38	0.388	0.387	5.99
12/13	330	1.6	9.50	0.10	1524	86	0.649	0.646	5.03
12/15	307	3.1	9.50	0.40	1510	21	0.609	0.603	6.02
12/17	298	1.9	9.50	0.53	1531	0	0.583	0.580	5.98
12/20	240	2.1	9.50	0.05	1706	113	0.422	0.418	4.69
12/22	249	1.8	9.50	0.44	1381	13	0.540	0.536	6.03
12/24	266	0.2	9.50	0.36	1508	28	0.529	0.528	5.98
12/27	268	1.4	9.50	0.53	1613	0	0.498	0.495	5.98
12/29	261	2.6	9.50	0.43	1399	15	0.559	0.554	6.01
MEAN	278	1.3	9.50	0.42	1483	19	0.575	0.572	5.94
S.DEV	47.38	.83	0	.13	201.95	27.34	.14	.14	.32
C V %	17	65.2	0	31.4	13.6	146.9	25.4	25.5	5.4

```
--------------------------------------------------------------------------------

    COMPOUND =HEXACHLOROETHANE             THETA C = 1

    PARAMETER =COD                         VOLUME-REACTOR = 3.17

------------------------------------------------------------------------------------
    DATE     SI      SE       F     FW      X      XE      FSI    F(SI-SE)   TC
    1982
----------------------------------------------------------------------------------
                                                            XV      XV
------------------------------------------------------------------------------------

    11/05    640     43.0    9.50   2.94    555    18     3.456   3.224     1.01
    11/12    640     60.0    9.50   3.10    386     4     4.969   4.503     1.00
    11/19    430     41.0    9.50   3.10    894     0     1.441   1.304     1.02
    11/26    510     67.0    9.50   2.96   1068    25     1.431   1.243     1.02
    12/03    420     33.0    9.50   3.17    971     0     1.296   1.194     1.00
    12/10    425     59.0    9.50   2.45    322    33     3.955   3.406     1.00
    12/17    395     48.0    9.50   3.05    561    10     2.110   1.854     1.00
    12/24    420     16.0    9.50   3.17    490     0     2.569   2.471     1.00

    MEAN     485     45.9    9.50   2.99    656    11     2.653   2.400     1.01
    S.DEV 101.31    16.53    0       .23  282.04  12.76   1.35    1.21      0
    C V % 20.8      36       0      7.9   43     113.5   50.9    50.8       .8
--------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND =HEXACHLOROETHANE                THETA C = 3

     PARAMETER =COD                            VOLUME-REACTOR = 3.17

-------------------------------------------------------------------------------------
     DATE     SI      SE       F      FW       X       XE      FSI    F(SI-SE)  TC
     1982                                                       XV       XV
-------------------------------------------------------------------------------------

     11/05    640    40.0     9.50   0.95    1026      34     1.869   1.753     2.57
     11/12    640    14.0     9.50   0.56    1150      64     1.668   1.631     3.00
     11/19    430     3.0     9.50   1.00     859       1     1.500   1.490     3.14
     11/26    510    50.0     9.50   0.81     998      30     1.531   1.381     2.96
     12/03    420    96.0     9.50   1.04     848       2     1.484   1.145     2.99
     12/10    425    31.0     9.50   0.58     760      41     1.676   1.554     3.00
     12/17    395    38.0     9.50   1.05     891       0     1.329   1.201     3.02

     MEAN     494    38.9     9.50   0.86     933      25     1.580   1.451     2.95
     S.DEV 105.68    29.87    0       .21   131.88   24.53    .17      .22      .17
     C V % 21.3      76.8     0      24.7    14.1    99.8    11       15.3      6
-------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------

    COMPOUND =HEXACHLOROETHANE            THETA C = 6

    PARAMETER =COD                        VOLUME-REACTOR = 3.17

--------------------------------------------------------------------------------
    DATE    SI      SE       F     FW      X       XE      FSI    F(SI-SE)  TC
    1982
--------------------------------------------------------------------------------
                                                           XV       XV
--------------------------------------------------------------------------------

    11/05   640     14.0    9.50   0.45   1300     11     1.475   1.443    6.02
    11/12   640     28.0    9.50   0.51   1340      3     1.431   1.369    5.98
    11/19   430      3.0    9.50   0.51   1386      3     0.930   0.923    5.99
    11/22   510     35.0    9.50   0.23   1197     38     1.277   1.189    6.05
    12/03   420     83.0    9.50   0.53   1233      0     1.021   0.819    5.98
    12/10   425     37.0    9.50   0.33   1705     38     0.747   0.682    5.99
    12/17   395     38.0    9.50   0.53   1531      0     0.773   0.699    5.98
    12/24   420     12.0    9.50   0.36   1508     28     0.835   0.811    5.98

    MEAN     485    31.3    9.50   0.43   1400     15     1.061   0.992    6.00
    S.DEV 101.31    24.63   0       .11   171.02   16.82   .29     .3      .02
    C V % 20.8      78.8    0      26.2   12.2    111.2   27.7    30.3     .4
--------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------

     COMPOUND =HEXACHLOROETHANE          THETA C = 1

     PARAMETER =TOC                      VOLUME-REACTOR = 3.17

----------------------------------------------------------------------------
     DATE     SI      SE        F     FW       X       XE      FSI    F(SI-SE)  TC
     1982                                                        XV       XV
----------------------------------------------------------------------------

     11/08    131    48.0     9.50   3.10     300       0     1.309   0.829     1.02
     11/12    129    56.5     9.50   3.10     386       4     1.002   0.563     1.00
     11/15     95    30.0     9.50   3.10     260       3     1.095   0.749     1.00
     11/17    115    29.0     9.50   3.10     771       0     0.447   0.334     1.02
     11/19     96    40.5     9.50   3.10     894       0     0.322   0.186     1.02
     11/22     92    34.0     9.50   3.17    1285       0     0.215   0.135     1.00
     11/24     94    34.0     9.50   3.11    1296      12     0.217   0.139     1.00
     11/26    169    34.0     9.50   3.96    1068      25     0.474   0.379     0.78
     11/29    104    48.0     9.50   3.06     633      11     0.492   0.265     1.00
     12/01    131    35.0     9.50   3.17    1257       0     0.312   0.229     1.00
     12/03    176    34.0     9.50   3.17     971       0     0.543   0.438     1.00
     12/06    149    22.0     9.50   3.01     501      12     0.888   0.757     1.00
     12/08    134    20.0     9.50   3.00     447      12     0.895   0.761     1.00
     12/10    154    22.0     9.50   2.45     322      33     1.433   1.229     1.00
     12/13    150    45.0     9.50   2.95     437      15     1.029   0.720     1.00
     12/15    142    30.0     9.50   2.96     314      10     1.355   1.069     1.00
     12/17    136    42.0     9.50   3.05     561      10     0.727   0.502     1.00
     12/20    148    28.0     9.50   1.54     480      98     0.924   0.749     1.00
     12/22    139    53.0     9.50   0.89     325      86     1.282   0.793     1.00
     12/24    176     6.0     9.50   3.17     490       0     1.076   1.040     1.00
     12/27    149    37.0     9.50   2.97     482      15     0.926   0.696     1.00
     12/29    150    37.0     9.50   3.05     323       6     1.392   1.048     1.00

     MEAN     134    34.8     9.50   2.92     627      16     0.834   0.619     0.99
     S.DEV 25.83     11.65    0       .61   345.49   26.13    .4       .32       .04
     C V % 19.2      33.5     0      20.9   55      163.3   48        52.5      4.9
------------------------------------------------------------------------
```

```
------------------------------------------------------------------------

  COMPOUND =HEXACHLOROETHANE          THETA C = 3

  PARAMETER =TOC                      VOLUME-REACTOR = 3.17

------------------------------------------------------------------------
  DATE     SI      SE      F      FW      X      XE     FSI   F(SI-SE)  TC
  1982                                                  XV      XV
------------------------------------------------------------------------

  11/10   128     59.0   9.50   0.61   1170     59   0.328   0.177    3.00
  11/12   129     46.0   9.50   0.56   1150     64   0.336   0.216    3.00
  11/15    95     23.0   9.50   0.58   1210     66   0.235   0.178    2.97
  11/17   115     25.0   9.50   1.00   1168      6   0.295   0.231    3.04
  11/19    96     27.0   9.50   1.00    859      1   0.335   0.241    3.14
  11/22    92     22.0   9.50   1.00   1092      0   0.252   0.192    3.17
  11/24    94     27.0   9.50   0.95   1102     15   0.256   0.182    2.97
  11/26   169     18.0   9.50   0.81    998     30   0.507   0.453    2.96
  11/29   104     30.0   9.50   1.00   1488      6   0.209   0.149    3.06
  12/01   131     20.0   9.50   1.00    995      6   0.395   0.334    3.02
  12/03   176     23.0   9.50   1.04    848      2   0.622   0.541    2.99
  12/06   149     23.0   9.50   0.20    885     98   0.503   0.425    2.58
  12/08   114     15.0   9.50   0.20    823    149   0.413   0.359    1.68
  12/10   154     22.0   9.50   0.58    760     41   0.607   0.521    3.00
  12/13   150     19.0   9.50   0.10    310    130   1.450   1.266    0.78
  12/15   142     18.0   9.50   0.88    437      9   0.974   0.850    3.00
  12/17   136     15.0   9.50   1.05    891      0   0.457   0.407    3.02
  12/20   148     32.0   9.50   0.05    542    466   0.818   0.641    0.39
  12/22   139     24.0   9.50   1.05    676      0   0.616   0.510    3.02
  12/24   176     44.0   9.50   1.05    810      0   0.651   0.488    3.02
  12/27   149     48.0   9.50   0.97   1084     11   0.412   0.279    3.00
  12/29   150     14.0   9.50   0.98   1316     11   0.342   0.310    3.02

  MEAN     133    27.0   9.50   0.76    937     53   0.501   0.407    2.72
  S.DEV 26.24    11.93   0       .34  284.62 102.07   .28     .26      .75
  C V % 19.6     44.2    0      45.2   30.3  191.9   57.5    64.3     27.7
------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------

     COMPOUND =HEXACHLOROETHANE          THETA C = 6

     PARAMETER =TOC                      VOLUME-REACTOR = 3.17

------------------------------------------------------------------------------------
     DATE     SI      SE        F     FW      X       XE      FSI   F(SI-SE)  TC
     1982                                                     XV       XV
------------------------------------------------------------------------------------

     11/08    131    46.0     9.50   0.47   1470      8      0.267   0.173    6.11
     11/10    128    46.0     9.50   0.52   1628      1      0.236   0.151    6.03
     11/12    129    45.0     9.50   0.51   1340      3      0.289   0.188    5.98
     11/15     95    27.0     9.50   0.52   1700      0      0.167   0.120    6.10
     11/17    115    28.0     9.50   0.45    977      8      0.353   0.267    6.05
     11/19     96    29.0     9.50   0.51   1386      3      0.208   0.145    5.99
     11/22     92    27.0     9.50   0.51   1496      2      0.184   0.130    6.07
     11/24     94    26.0     9.50   0.53   1502      0      0.188   0.136    5.98
     11/26    169    35.0     9.50   0.23   1197     38      0.423   0.335    6.05
     11/29    104    53.0     9.50   0.52   2016      2      0.155   0.076    5.99
     12/01    131    35.0     9.50   0.36   1404     25      0.280   0.205    6.06
     12/03    176    38.0     9.50   0.53   1233      0      0.428   0.335    5.98
     12/06    149    23.0     9.50   0.39   1680     24      0.265   0.224    6.09
     12/08    134    45.0     9.50   0.27   1400     39      0.286   0.189    6.01
     12/10    154    37.0     9.50   0.33   1705     38      0.271   0.206    5.99
     12/13    150    25.0     9.50   0.10   1524     86      0.295   0.246    5.03
     12/15    142    30.0     9.50   0.40   1510     21      0.282   0.222    6.02
     12/17    136    24.0     9.50   0.53   1531      0      0.266   0.219    5.98
     12/20    148    32.0     9.50   0.05   1706    113      0.260   0.204    4.69
     12/22    139    30.0     9.50   0.44   1381     13      0.302   0.237    6.03
     12/24    176     9.0     9.50   0.36   1508     28      0.350   0.332    5.98
     12/27    149    37.0     9.50   0.53   1613      0      0.277   0.208    5.98
     12/29    150    11.0     9.50   0.43   1399     15      0.321   0.298    6.01

    MEAN      134    32.1     9.50   0.41   1492     20      0.276   0.211    5.92
    S.DEV 25.27      10.78    0       .13   210.2   28.65     .07     .06      .34
    C V % 18.8       33.6     0      33.5   14      141.1    25.4    33.2      5.7

------------------------------------------------------------------------------
```

COMPOUND =COMBINED THETA C = 1

PARAMETER =BOD VOLUME-REACTOR = 3

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/1	191	1.2	8.93	2.96	780	5	0.729	0.724	1.00
11/3	278	3.7	8.93	2.79	530	18	1.561	1.541	1.00
11/5	273	6.3	8.93	2.90	610	10	1.332	1.301	1.00
11/8	253	11.7	8.93	2.96	810	6	0.930	0.887	1.00
11/10	309	9.9	8.93	2.89	610	11	1.508	1.460	1.30
11/12	328	2.0	8.93	2.96	540	4	1.808	1.797	1.00
11/15	382	6.1	8.93	2.92	750	10	1.516	1.492	1.00
11/17	374	2.9	8.93	2.95	670	6	1.662	1.649	1.00
11/19	343	1.1	8.64	2.98	680	2	1.453	1.448	1.00
11/22	334	15.3	8.78	3.00	860	0	1.137	1.085	1.00
11/24	293	3.5	8.93	2.91	940	14	0.928	0.917	1.00
11/26	290	1.5	8.93	2.83	580	16	1.488	1.481	1.00
11/29	294	8.7	8.93	2.58	420	28	2.084	2.022	1.00
12/01	334	3.3	8.93	2.85	660	16	1.506	1.491	1.00
12/03	249	6.5	8.93	2.82	530	16	1.398	1.362	1.00
12/06	268	3.8	8.93	3.00	300	0	2.659	2.621	1.00
12/08	283	0.6	8.93	3.00	600	6	1.404	1.401	1.00
12/10	249	0.6	8.93	2.89	890	16	0.833	0.831	1.00
12/13	362	0.7	8.93	2.73	370	16	2.912	2.907	1.00
12/15	338	1.0	8.93	2.79	350	12	2.875	2.866	1.00
12/17	285	1.2	8.93	2.86	340	8	2.495	2.485	1.00
12/20	271	1.0	8.93	2.63	340	20	2.373	2.364	1.00
12/22	278	1.3	8.93	3.00	340	0	2.434	2.422	1.00
12/24	247	0.5	8.93	2.05	389	30	1.890	1.886	1.16
12/27	256	12.5	8.93	3.00	300	0	2.540	2.416	1.00
MEAN	294	4.3	8.91	2.85	568	11	1.738	1.714	1.01
S.DEV	45.66	4.27	.06	.2	198.32	8.51	.64	.64	.03
C V %	15.5	99.9	.7	7	34.9	80.6	37.1	37.4	3.2

```
-----------------------------------------------------------------------------

     COMPOUND =COMBINED                    THETA C = 3

     PARAMETER =BOD                        VOLUME-REACTOR = 3.1

---------------------------------------------------------------------------------
     DATE     SI      SE       F     FW      X       XE       FSI    F(SI-SE)  TC
     1982                                                      XV       XV
---------------------------------------------------------------------------------

     11/01   191     1.6    9.50   1.03   1760       0     0.333   0.330     3.01
     11/03   278     1.0    9.05   1.02   1670       2     0.486   0.484     3.01
     11/05   273     2.9    9.22   1.00   1818       4     0.447   0.442     3.04
     11/08   253    12.0    8.78   1.03   2620       0     0.273   0.261     3.01
     11/10   309    12.2    9.36   1.02   3070       2     0.304   0.292     3.02
     11/12   328     0.5    9.36   1.03   1900       0     0.521   0.520     3.01
     11/15   382     1.5    9.07   1.01   1780       4     0.628   0.625     3.02
     11/17   374     2.1    8.93   0.00   1502     230     0.717   0.713     2.27
     11/19   343     0.8    9.22   1.00   1477       8     0.691   0.689     2.97
     11/22   334     0.7    9.07   1.03   1419       0     0.689   0.687     3.01
     11/24   293     1.3    9.50   1.01   1735       5     0.518   0.515     3.00
     11/26   290     1.4    9.50   0.80   1337      34     0.665   0.661     3.04
     11/29   294     2.0    9.07   0.97   1570      12     0.548   0.544     3.00
     12/01   334     3.9    8.78   0.00    709     407     1.334   1.319     0.62
     12/03   249     2.6    5.10   0.00    651     329     0.629   0.623     1.20
     12/06   268     3.5    9.36   0.00    245     105     3.303   3.260     0.77
     12/08   283     3.0    9.65   0.00    556     321     1.584   1.568     0.56
     12/10   249     0.6    9.79   0.00   1487     600     0.529   0.528     0.78
     12/13   362     1.1    9.07   0.95   1182      10     0.896   0.893     3.04
     12/15   338     1.4    8.64   0.96   1536      14     0.613   0.611     3.01
     12/17   285     0.8    8.93   0.93   1200      15     0.684   0.682     3.01
     12/27   256     2.7    8.93   0.20    866      82     0.852   0.843     3.02
     12/29   305     6.3    5.76   0.00    620     296     0.914   0.895     1.13

     MEAN     299    2.9    8.85   0.65   1422     108     0.789   0.782     2.42
     S.DEV 46.05    3.2      1.12   .47  649.87  169.18   .62     .61       .97
     C V % 15.4     111.8    12.6  72.4   45.6   156.9  79.2     78.9      40.3

-----------------------------------------------------------------------------
```

```
-----------------------------------------------------------------------------

   COMPOUND =COMBINED                    THETA C = 6

   PARAMETER =BOD                        VOLUME-REACTOR = 3.13

---------------------------------------------------------------------------------
   DATE    SI      SE       F     FW      X      XE      FSI   F(SI-SE)  TC
   1982                                                   XV      XV
---------------------------------------------------------------------------------

   11/01   191     1.4    9.39   0.36   1360     24    0.421   0.418    6.03
   11/03   279     7.6    9.39   0.46   1490     10    0.562   0.546    6.02
   11/05   273    13.5    9.39   0.52   1290      0    0.635   0.603    6.02
   11/08   253    12.1    9.39   0.44   1153     10    0.658   0.627    6.05
   11/10   309    13.1    9.39   0.48   1222      5    0.759   0.726    6.06
   11/12   328     2.8    9.39   0.39   1440     18    0.683   0.678    6.23
   11/15   382     2.5    9.39   0.46   1407      8    0.814   0.809    6.13
   11/17   374     1.1    9.39   0.52   1587      0    0.707   0.705    6.02
   11/19   343     1.9    9.39   0.47   2073     14    0.496   0.494    5.90
   11/22   334     0.7    9.39   0.44   1975     18    0.507   0.506    6.00
   11/24   293     1.0    9.39   0.36   1998     35    0.440   0.438    6.04
   11/26   290     0.5    9.39   0.15   1835    115    0.474   0.473    4.29
   11/29   294     2.0    9.39   0.14   1198     82    0.736   0.731    4.05
   12/01   334     3.0    9.39   0.10    686     56    1.461   1.448    3.65
   12/03   249     1.0    9.39   0.05    993     66    0.752   0.749    4.67
   12/06   268     1.6    9.39   0.10    915    115    0.879   0.873    2.47
   12/08   283     2.1    9.39   0.10    779    204    1.090   1.082    1.24
   12/10   249     0.4    9.39   0.10    787     94    0.949   0.948    2.59
   12/13   362     3.4    9.39   0.39   1081     25    1.005   0.995    5.23
   12/15   338     3.9    9.39   0.10    980     60    1.035   1.023    4.68
   12/17   295     2.6    9.39   0.51   1081      1    0.791   0.784    6.04
   12/20   271     1.8    9.39   0.45   1389     11    0.585   0.581    6.01
   12/22   278     1.6    9.39   0.05   1132    375    0.737   0.733    1.00
   12/24   247     0.1    9.39   0.05   1392    119    0.532   0.532    3.69
   12/27   256     1.9    9.39   0.44   1472     13    0.522   0.518    6.03
   12/29   305     2.7    9.39   0.46   1510     11    0.606   0.601    6.01

   MEAN    295     3.3    9.39   0.31   1316     57    0.724   0.716    4.93
   S.DEV 44.77    3.82    0       .18   373.18  82.02   .23     .23     1.59
   C V % 15.1    115.2    0      58     28.3   143.2   32.9    33.1    32.4
-----------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------

     COMPOUND =COMBINED                   THETA C = 1

     PARAMETER =COD                       VOLUME-REACTOR = 3

------------------------------------------------------------------------------
     DATE    SI     SE      F     FW      X      XE      FSI   F(SI-SE)  TC
     1982                                                 XV      XV
------------------------------------------------------------------------------

     11/05   730   60.0   8.93   2.90   610     10    3.447   3.164     1.03
     11/12   540   34.0   8.93   2.96   540      4    2.881   2.699     1.03
     11/19   495   29.0   8.64   2.98   680      2    2.029   1.910     1.03
     11/26   480   36.0   8.93   2.83   580     16    2.384   2.205     1.03
     12/03   420   40.0   8.93   2.82   530     16    2.283   2.065     1.03
     12/10   435   35.0   8.93   2.89   890     16    1.408   1.295     1.03
     12/17   420   57.0   8.93   2.86   340      8    3.677   3.178     1.00
     12/24   475   26.0   8.93   2.05   389     30    3.635   3.426     1.16
     12/31   500   41.0   8.93   2.48   320     16    4.651   4.270     1.07

     MEAN    499   39.8   8.90   2.75   542     13    2.933   2.691     1.05
     S.DEV 95.24   11.63   .09    .3  180.22   8.37    1        .91      .04
     C V % 19      29.2   1      10.9  33.2   63.8    34.3    33.9      4.4

--------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------

     COMPOUND =COMBINED                  THETA C = 3

     PARAMETER =COD                      VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
     DATE    SI      SE       F     FW      X       XE      FSI   F(SI-SE)  TC
     1982                                                    XV      XV
----------------------------------------------------------------------------------

     11/05   730    67.0    9.22  1.00   1818        4    1.194  1.085     3.04
     11/12   540    60.0    9.36  1.03   1900        0    0.858  0.763     3.01
     11/19   495    29.0    9.22  1.00   1477        8    0.997  0.938     2.97
     11/26   480    15.0    9.50  0.80   1337       34    1.100  1.066     3.04
     12/03   420    40.0    5.10  0.00    651      329    1.061  0.960     1.20
     12/10   435    40.0    9.79  0.00   1487      600    0.924  0.839     0.78
     12/17   420    47.0    8.93  0.93   1200       15    1.008  0.895     3.01
     12/29   500    28.0    5.76  0.00    620      296    1.498  1.415     1.13

     MEAN    503    40.8    8.36  0.60   1311     161     1.080  0.995     2.27
     S.DEV 101.34   17.16   1.83   .49  476.38  223.79    .19    .2       1.02
     C V % 20.1     42.1    21.9  83.6   36.3   139.2    18.3   20.1      45.2

------------------------------------------------------------------------------
```

COMPOUND =COMBINED

PARAMETER =COD

THETA C = 6

VOLUME-REACTOR = 3.13

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/05	730	47.0	9.39	0.52	1290	0	1.698	1.588	6.02
11/12	540	14.0	9.39	0.39	1440	18	1.125	1.096	6.23
11/19	495	2.0	9.39	0.52	2073	47	0.716	0.713	4.34
11/26	480	7.5	9.39	0.15	1835	115	0.785	0.772	4.29
12/03	420	28.0	9.39	0.05	993	66	1.269	1.184	4.67
12/10	435	29.0	9.39	0.10	787	94	1.658	1.548	2.59
12/17	420	12.0	9.39	0.51	1081	1	1.166	1.132	6.04
12/24	475	18.0	9.39	0.05	1392	119	1.024	0.985	3.69
12/29	500	18.0	9.39	0.46	1510	11	0.993	0.958	5.96
MEAN	450	17.6	8.45	0.28	1240	47	1.043	0.998	4.38
S.DEV	181.68	14.15	2.96	.22	578.84	48.36	.48	.45	1.95
C V %	40.4	80.6	35.1	80.9	46.6	102.6	46.7	45.3	44.5

```
--------------------------------------------------------------------------------

     COMPOUND =COMBINED                    THETA C = 1

     PARAMETER =TOC                        VOLUME-REACTOR = 3

------------------------------------------------------------------------------------
     DATE    SI     SE       F     FW      X      XE      FSI   F(SI-SE)  TC
     1982                                                  XV      XV
------------------------------------------------------------------------------------

     11/08   157    43.0    8.93   2.96   810      6    0.577   0.419     1.00
     11/10   134    41.0    8.93   2.89   610     11    0.654   0.454     1.00
     11/12   130    37.0    8.93   2.96   540      4    0.717   0.513     1.00
     11/15   122    40.0    8.93   2.92   750     10    0.484   0.325     1.00
     11/17   110    32.0    8.93   2.95   670      6    0.489   0.347     1.00
     11/19   104    27.0    8.64   2.98   680      2    0.440   0.326     1.00
     11/22   105    15.3    8.78   3.00   860      0    0.357   0.305     1.00
     11/24   100    21.0    8.93   2.91   940     14    0.317   0.250     1.00
     11/26   158    21.0    8.93   2.83   580     16    0.811   0.703     1.00
     11/29   169    42.0    8.93   2.58   420     28    1.198   0.900     1.00
     12/03   176    24.0    8.93   2.82   530     16    0.988   0.854     1.00
     12/06   142    21.5    8.93   3.00   300      0    1.409   1.196     1.00
     12/08   149    27.0    8.93   3.00   600      0    0.739   0.605     1.00
     12/10   156    23.0    8.93   2.89   890     16    0.522   0.445     1.00
     12/13   111    21.0    8.93   2.73   370     16    0.893   0.724     1.00
     12/15   130    43.0    8.93   2.79   350     12    1.106   0.740     1.00
     12/17   130    23.0    8.93   2.86   340      8    1.138   0.937     1.00
     12/20   120    23.0    8.93   2.63   340     20    1.051   0.849     1.00
     12/22   118    22.0    8.93   3.00   340      0    1.033   0.840     1.00
     12/24   136    51.0    8.93   2.05   389     30    1.041   0.650     1.16
     12/27   177    65.0    8.93   3.00   300      0    1.756   1.111     1.00
     12/29   113    42.0    8.93   2.48   320     16    1.051   0.660     1.07

     MEAN    134    32.0    8.91   2.83   542     11    0.853   0.643     1.01
     S.DEV 23.71    12.48    .06    .22  210.92  8.87    .36     .26       .03
     C V % 17.7     38.9     .7     8     38.9   84.5    42.6    41.8      3.6
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------

    COMPOUND =COMBINED                      THETA C = 3

    PARAMETER =TOC                          VOLUME-REACTOR = 3.1

-------------------------------------------------------------------------------------
    DATE     SI      SE       F     FW      X      XE     FSI    F(SI-SE)  TC
    1982                                                   XV       XV
-------------------------------------------------------------------------------------

    11/08    157     37.0    8.78  1.03   2620      0    0.170   0.130    3.01
    11/10    134     38.0    9.36  1.02   3070      2    0.132   0.094    3.02
    11/12    130     33.0    9.36  1.03   1900      0    0.207   0.154    3.01
    11/15    122     33.0    9.07  1.01   1780      4    0.201   0.146    3.02
    11/17    110     26.0    8.93  0.00    410    230    0.773   0.590    0.62
    11/22    105     21.0    9.07  1.03   1419      0    0.216   0.173    3.01
    11/24    100     19.5    9.50  1.01   1735      5    0.177   0.142    3.00
    11/26    158     34.0    9.50  0.80   1337     34    0.362   0.284    3.04
    12/03    176     17.0    5.10  0.00    651    329    0.445   0.402    1.20
    12/06    142     17.0    9.36  0.00    245    105    1.750   1.540    0.77
    12/08    149     31.0    9.65  0.00    556    321    0.834   0.661    0.56
    12/10    156     20.0    9.79  0.00   1487    600    0.331   0.289    0.78
    12/13    111     15.0    9.07  0.95   1182     10    0.275   0.238    3.04
    12/15    130     25.0    8.64  0.96   1536     14    0.236   0.191    3.01
    12/17    130     18.0    8.93  0.93   1200     15    0.312   0.269    3.01
    12/20    120     19.0    9.79  0.60   1032     49    0.367   0.309    2.99
    12/27    177     22.0    8.93  0.20    866     82    0.589   0.516    3.02
    12/29    133     31.0    5.76  0.00    620    296    0.399   0.306    1.13

    MEAN     136     25.4    8.81  0.59   1314    116    0.432   0.357    2.29
    S.DEV  22.93     7.61    1.27   .47  742.97  169.7    .38     .33     1.06
    C V % 16.9       30      14.5  80.3   56.5   145.7   89      94.1     46.3
--------------------------------------------------------------------------------
```

COMPOUND =COMBINED

THETA C = 6

PARAMETER =TOC

VOLUME-REACTOR = 3.13

DATE 1982	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
11/08	157	45.0	9.39	0.44	1153	10	0.409	0.291	6.05
11/10	134	36.0	9.39	0.48	1222	5	0.329	0.241	6.06
11/12	130	59.0	9.39	0.39	1440	18	0.271	0.148	6.23
11/15	122	33.0	9.39	0.46	1407	8	0.260	0.190	6.13
11/17	110	33.0	9.39	0.52	1587	0	0.208	0.146	6.02
11/19	104	28.0	9.39	0.47	2073	14	0.151	0.110	5.90
11/22	105	26.0	9.39	0.44	1975	18	0.159	0.120	6.00
11/24	100	22.0	9.39	0.36	1998	35	0.150	0.117	6.04
11/26	158	17.0	9.39	0.15	1835	115	0.258	0.231	4.29
11/29	169	39.0	9.39	0.14	1198	82	0.423	0.326	4.05
12/03	176	22.0	9.39	0.05	993	66	0.532	0.465	4.67
12/06	142	18.0	9.39	0.10	915	115	0.466	0.407	2.47
12/08	149	22.0	9.39	0.10	779	204	0.574	0.489	1.24
12/10	156	34.5	9.39	0.10	787	94	0.595	0.463	2.59
12/13	111	29.0	9.39	0.39	1081	25	0.308	0.228	5.23
12/15	130	32.0	9.39	0.10	980	60	0.398	0.300	4.68
12/17	130	33.0	9.39	0.51	1081	1	0.361	0.269	6.04
12/20	120	19.0	9.39	0.45	1389	11	0.259	0.218	6.01
12/22	118	31.0	9.39	0.05	1132	375	0.313	0.231	1.00
12/27	177	26.0	9.39	0.44	1472	13	0.361	0.308	6.03
MEAN	135	30.2	9.39	0.31	1325	63	0.339	0.265	4.84
S.DEV	24.43	9.99	0	.17	397.81	90.28	.13	.11	1.71
C V %	18.1	33	0	58.4	30	142.2	39.2	44.5	35.3

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 1

PARAMETER =BOD VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	309	1.4	9.50	3.08	610	8	1.518	1.511	1.00
01/19	275	1.7	9.50	3.18	514	6	1.603	1.593	0.97
01/21	201	1.0	9.50	3.17	642	0	0.938	0.934	1.00
01/24	289	1.5	11.95	3.17	490	0	2.223	2.212	1.00
01/26	272	0.9	9.50	3.17	454	0	1.795	1.790	1.00
01/28	214	0.2	9.50	3.08	560	8	1.145	1.144	1.00
01/31	246	0.0	10.94	3.06	452	4	1.878	1.878	1.01
02/02	265	7.5	9.50	3.06	488	0	1.627	1.581	1.04
02/04	285	2.4	9.36	3.17	502	0	1.676	1.662	1.00
02/07	265	4.8	9.50	3.17	410	0	1.937	1.902	1.00
02/09	306	10.3	9.50	3.17	493	6	1.860	1.798	0.98
02/11	303	3.9	9.50	3.17	740	8	1.227	1.211	0.98
02/14	281	4.0	9.50	2.80	620	24	1.358	1.339	1.04
02/16	316	4.7	9.50	2.94	490	12	1.933	1.904	1.02
02/14	281	4.0	9.50	2.80	620	24	1.358	1.339	1.04
02/16	316	4.7	9.50	2.94	490	12	1.933	1.904	1.02
02/18	277	8.2	9.50	2.00	310	42	2.678	2.599	1.05
02/21	161	4.4	9.50	2.17	379	40	1.273	1.238	1.08
02/23	323	6.0	9.38	2.11	530	60	1.803	1.770	1.08
02/25	294	8.5	9.50	1.24	334	68	2.638	2.562	1.08
02/28	255	5.3	9.40	0.57	445	122	1.699	1.664	1.06
03/02	146	10.6	9.52	1.78	324	60	1.353	1.255	0.99
03/04	238	9.4	9.40	2.50	392	28	1.800	1.729	1.06
MEAN	255	4.4	9.25	2.56	470	22	1.636	1.605	0.98
S.DEV	71.29	3.31	2.05	.88	145.85	30.06	.54	.53	.21
C V %	27.9	75.4	22.1	34.4	31	135.6	33.3	33.2	21.5

COMPOUND =1-2 DICHLOROELTYLENE　　THETA C = 3

PARAMETER =BOD　　VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	309	14.1	9.50	1.03	1202	4	0.770	0.735	3.00
01/19	275	1.1	9.50	1.05	1109	0	0.743	0.740	3.02
01/21	201	0.6	9.50	0.99	1186	10	0.508	0.506	3.00
01/26	289	3.1	9.50	1.02	998	4	0.868	0.859	3.01
01/26	272	3.7	9.50	1.02	1046	0	0.779	0.769	3.11
01/28	214	0.6	9.50	1.00	1118	4	0.574	0.572	3.08
01/31	246	0.3	9.36	1.06	1092	0	0.665	0.664	2.99
02/02	265	0.5	9.50	0.92	986	14	0.805	0.804	3.04
02/04	285	2.5	9.22	0.99	1102	8	0.752	0.746	3.02
02/07	265	3.7	8.93	0.60	944	48	0.791	0.780	3.10
02/09	306	2.5	9.50	1.06	903	0	1.016	1.007	2.99
02/11	303	1.3	9.40	0.91	890	14	1.010	1.005	3.04
02/12	281	2.9	9.50	0.30	900	72	0.936	0.926	3.06
02/16	316	1.8	9.36	1.06	1200	0	0.778	0.773	3.00
02/18	277	3.2	9.40	1.00	930	6	0.883	0.873	3.01
02/21	161	2.3	9.50	0.90	1190	20	0.405	0.400	3.03
02/23	323	2.9	9.50	1.05	1042	0	0.929	0.921	3.02
02/25	294	1.7	9.50	1.06	1382	0	0.638	0.634	2.99
02/28	255	2.3	9.48	0.98	978	6	0.780	0.773	3.07
03/02	146	2.1	9.50	0.98	996	8	0.439	0.433	3.02
03/04	238	2.8	9.46	1.04	976	0	0.728	0.719	3.05
03/07	256	2.1	9.52	1.02	980	4	0.784	0.778	3.01
03/09	263	1.2	9.48	1.06	974	0	0.808	0.804	2.99
MEAN	252	2.5	9.05	0.92	1005	9	0.725	0.718	2.90
S.DEV	69.87	2.69	1.93	.25	245.59	16.92	.22	.21	.61
C V %	27.7	109.2	21.3	28.2	24.4	183	30.4	30.4	21.3

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 10

PARAMETER =BOD VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	309	14.7	9.50	0.05	1678	298	0.552	0.526	1.83
01/19	275	1.4	9.50	0.00	1512	206	0.545	0.542	2.45
01/21	201	2.6	9.50	0.05	1712	158	0.352	0.347	3.44
01/24	289	5.1	9.50	0.00	1578	138	0.549	0.539	3.82
01/26	272	2.3	9.50	0.00	1038	260	0.785	0.779	1.33
01/28	214	1.3	9.50	0.00	946	129	0.682	0.678	2.43
01/31	246	4.0	9.50	0.16	1098	18	0.671	0.661	%10.12
02/02	265	0.9	9.50	0.24	1196	10	0.664	0.662	%10.15
02/04	285	3.4	9.36	0.04	1278	38	0.658	0.651	%10.00
02/07	265	4.0	9.36	0.00	660	288	1.186	1.168	0.78
02/09	306	3.0	9.36	0.22	790	8	1.144	1.132	%10.14
02/11	303	1.7	9.50	0.05	1330	65	0.683	0.679	6.19
02/14	281	1.9	9.50	0.00	1060	493	0.794	0.789	0.72
02/16	316	1.8	9.40	0.00	1130	64	0.829	0.825	5.95
02/18	277	4.2	9.38	0.00	1178	90	0.696	0.685	4.42
02/21	161	1.4	9.50	0.18	1422	20	0.339	0.336	%10.19
02/23	323	2.2	9.45	0.05	1592	62	0.605	0.601	7.62
02/25	294	1.6	9.50	0.00	1556	198	0.566	0.563	2.62
02/28	255	9.1	9.46	0.00	1580	130	0.482	0.464	4.07
03/02	146	2.6	9.48	0.14	1688	32	0.259	0.254	%10.16
03/04	238	2.7	9.50	0.25	1708	12	0.418	0.413	%10.06
03/07	256	0.0	9.48	0.14	1680	32	0.456	0.456	%10.13
03/09	263	1.4	9.46	0.10	1486	34	0.528	0.525	%10.09
MEAN	252	3.1	9.07	0.07	1287	116	0.602	0.595	5.78
S.DEV	69.87	3.11	1.93	.08	410.89	122.44	.25	.25	3.83
C V %	27.7	101.9	21.3	123.9	31.9	105.5	42.2	42.3	66.3

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 1

PARAMETER =COD VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	420	23.0	9.50	3.08	610	8	2.063	1.950	1.00
01/26	370	10.0	9.50	3.17	490	0	2.263	2.202	1.00
02/04	390	18.0	9.36	3.17	502	0	2.294	2.188	1.00
02/11	430	12.0	9.50	3.17	740	8	1.741	1.693	0.98
02/18	410	50.0	9.50	2.00	310	42	3.964	3.480	1.05
02/25	104	39.0	9.50	1.24	334	68	0.933	0.583	1.08
03/04	350	27.0	9.40	2.50	392	28	2.648	2.443	1.06
03/09	368	20.0	9.42	0.69	298	78	3.670	3.470	1.07
MEAN	316	22.1	8.41	2.11	408	26	2.175	2.001	0.92
S.DEV	153.98	15.19	3.15	1.2	212.27	30.42	1.23	1.15	.34
C V %	48.7	68.7	37.5	57.2	51.9	118	56.6	57.8	37.7

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 3

PARAMETER =COD VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	420	33.0	9.50	1.03	1202	4	1.047	0.965	3.00
01/26	370	10.0	9.50	1.02	1046	0	1.060	1.031	3.11
02/04	390	10.0	9.22	0.99	1102	8	1.029	1.003	3.02
02/11	430	37.0	9.40	0.91	890	14	1.433	1.309	3.05
02/18	410	31.0	9.50	1.00	930	6	1.321	1.221	3.01
02/25	390	28.0	9.50	1.06	1382	0	0.846	0.785	2.99
03/04	350	9.0	9.46	1.04	976	0	1.070	1.043	3.05
03/09	368	18.0	9.48	1.06	374	0	1.130	1.075	2.99
MEAN	348	19.6	8.40	0.90	945	4	0.993	0.937	2.69
S.DEV	132.88	13.06	3.14	.34	385.67	4.97	.4	.38	1
C V %	38.2	66.8	37.5	37.8	40.8	139.9	41.2	40.7	37.5

```
-------------------------------------------------------------------------------

     COMPOUND =1-2 DICHLOROELTYLENE       THETA C = 10

     PARAMETER =COD                       VOLUME-REACTOR = 3.17

-----------------------------------------------------------------------------------
     DATE    SI      SE       F      FW       X       XE      FSI    F(SI-SE)  TC
     1983                                                     XV       XV
-----------------------------------------------------------------------------------

     01/17   420    43.0    9.50   %50.00  1678     298     0.750   0.673     0.07
     01/26   370    11.0    9.50   0.00    1038     260     1.068   1.036     1.33
     02/04   390    19.0    9.36   0.04    1278      38     0.901   0.857     %10.00
     02/11   430    27.0    9.50   0.05    1330      65     0.969   0.908     6.19
     02/18   410    46.0    9.50   0.00    1178      90     1.043   0.926     4.37
     02/25   390    26.0    9.50   0.00    1556     198     0.751   0.701     2.62
     03/04   350    22.0    9.50   0.25    1708      12     0.614   0.576     %10.06
     03/09   368    26.0    9.46   0.10    1486      34     0.739   0.687     %10.09

     MEAN    348    24.4    8.42   5.60    1250     111     0.760   0.707     4.97
     S.DEV 132.88   14.29    3.15   16.64   519.86  112.17   .32     .3       4.28
     C V % 38.2     58.4     37.5   297     41.5    101.4   42.6    42.9      86.1
-------------------------------------------------------------------------------
```

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 1

PARAMETER =TOC VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	118	20.0	9.50	3.08	610	8	0.580	0.481	1.00
01/19	104	10.0	9.50	3.18	514	6	0.606	0.548	0.97
01/21	104	19.0	9.50	3.17	642	0	0.485	0.397	1.00
01/24	127	34.0	11.95	3.17	490	0	0.977	0.715	1.00
01/26	124	20.0	9.50	3.17	454	0	0.819	0.687	1.00
01/28	129	26.0	9.50	3.08	560	8	0.690	0.551	1.00
01/31	104	20.0	10.94	3.06	452	4	0.794	0.641	1.01
02/02	116	43.0	9.50	3.06	488	0	0.712	0.448	1.04
02/04	110	27.0	9.36	3.17	502	0	0.647	0.488	1.00
02/07	129	40.0	9.50	3.17	410	0	0.943	0.651	1.00
02/09	118	34.0	9.50	3.17	493	6	0.717	0.511	0.98
02/11	114	27.0	9.50	3.17	740	8	0.462	0.352	0.98
02/14	122	30.0	9.50	2.80	620	24	0.590	0.445	1.04
02/16	126	30.0	9.50	2.94	490	12	0.771	0.587	1.02
02/18	149	37.0	9.50	2.00	310	42	1.440	1.083	1.05
02/21	115	39.0	9.50	2.17	379	40	0.909	0.601	1.08
02/23	136	25.0	9.38	2.11	530	60	0.759	0.620	1.08
02/25	104	27.0	9.50	1.24	334	68	0.933	0.691	1.08
03/02	140	27.0	9.52	1.78	324	60	1.298	1.047	0.99
03/04	112	23.0	9.40	2.50	392	28	0.847	0.673	1.06
03/07	100	22.0	9.42	0.00	192	142	1.548	1.207	0.46
03/09	112	23.0	9.50	0.69	298	78	1.126	0.895	1.06
MEAN	119	27.4	9.66	2.54	465	27	0.848	0.651	1.00
S.DEV	12.85	7.99	.6	.9	129.3	35.97	.28	.22	.12
C V %	10.8	29.1	6.2	35.7	27.8	133.2	34	34.5	12.6

COMPOUND =1-2 DICHLOROELTYLENE THETA C = 3

PARAMETER =TOC VOLUME-REACTOR = 3.17

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	118	47.0	9.50	1.03	1202	4	0.294	0.177	3.00
01/19	104	24.0	9.50	1.05	1109	0	0.281	0.216	3.02
01/21	104	15.0	9.50	0.98	1186	10	0.263	0.225	3.01
01/24	127	27.0	9.50	1.02	998	4	0.381	0.300	3.01
01/26	124	16.5	9.50	1.02	1046	0	0.355	0.308	3.11
01/28	129	18.0	9.50	1.00	1118	4	0.346	0.298	3.08
01/31	104	25.0	9.36	1.06	1092	0	0.281	0.214	2.99
02/02	116	35.0	9.50	0.92	986	14	0.353	0.246	3.04
02/04	110	47.0	9.22	0.99	1102	8	0.290	0.166	3.02
02/07	129	33.0	8.93	0.60	944	48	0.385	0.286	3.10
02/09	118	18.0	9.50	1.06	903	0	0.392	0.332	2.99
02/11	114	23.0	9.40	0.91	890	14	0.380	0.303	3.05
02/14	122	28.0	9.50	0.30	900	72	0.406	0.313	3.06
02/16	126	30.0	9.36	1.06	1200	0	0.310	0.236	3.00
02/18	149	37.0	9.40	1.00	930	6	0.475	0.357	3.01
02/21	115	30.0	9.50	0.90	1190	20	0.290	0.214	3.03
02/23	136	26.0	9.50	1.05	1042	0	0.391	0.316	3.02
02/25	104	28.0	9.50	1.06	1382	0	0.226	0.165	2.99
03/02	140	21.0	9.50	0.98	996	8	0.421	0.358	3.02
03/04	112	27.0	9.46	1.04	976	0	0.342	0.260	3.05
03/07	100	19.0	9.52	1.02	980	4	0.306	0.248	3.01
03/09	112	27.0	9.48	1.06	974	0	0.344	0.261	2.99
MEAN	119	27.3	9.44	0.96	1052	10	0.341	0.264	3.03
S.DEV	12.85	8.62	.13	.17	124.91	17.57	.05	.05	.03
C V %	10.8	31.5	1.4	18.5	11.8	179	17.5	22	1.1

```
------------------------------------------------------------------------------

      COMPOUND =1-2 DICHLOROELTYLENE       THETA C = 10

      PARAMETER =TOC                       VOLUME-REACTOR = 3.17

--------------------------------------------------------------------------------
      DATE    SI      SE       F     FW      X      XE      FSI    F(SI-SE)  TC
      1983                                                  XV       XV
--------------------------------------------------------------------------------

      01/17   118    55.0    9.50   0.05   1678    298     0.211   0.113    1.83
      01/19   104    12.0    9.50   0.00   1512    206     0.206   0.182    2.45
      01/21   104    15.0    9.50   0.05   1712    158     0.182   0.156    3.44
      01/24   127    29.0    9.50   0.00   1578    138     0.241   0.186    3.82
      01/26   124    16.0    9.50   0.00   1038    260     0.358   0.312    1.33
      01/28   129    23.0    9.50   0.00    940    129     0.411   0.338    2.43
      01/31   104    29.0    9.50   0.16   1098     18     0.284   0.205    %10.12
      02/02   116    34.0    9.50   0.24   1196     10     0.291   0.205    %10.15
      02/04   110    37.0    9.36   0.04   1278     38     0.254   0.169    %10.00
      02/07   129    38.0    9.36   0.00    660    288     0.577   0.407    0.78
      02/09   118    20.0    9.36   0.22    790      8     0.441   0.366    %10.14
      02/11   114    20.0    9.50   0.05   1330     65     0.257   0.212    6.19
      02/14   122    21.0    9.50   0.00   1060    493     0.345   0.286    0.72
      02/16   126    30.0    9.40   0.00   1130     64     0.331   0.252    5.95
      02/18   149    41.0    9.38   0.00   1178     90     0.374   0.271    4.42
      02/21   115    29.0    9.50   0.18   1422     20     0.242   0.181    %10.19
      02/23   136    22.0    9.45   0.05   1592     62     0.255   0.213    7.62
      02/25   104    34.0    9.50   0.00   1556    198     0.200   0.135    2.62
      03/02   140    23.0    9.48   0.14   1688     32     0.248   0.207    %10.16
      03/04   112    24.0    9.50   0.25   1708     12     0.197   0.154    %10.06
      03/07   100    17.0    9.48   0.14   1680     32     0.178   0.148    %10.13
      03/09   112    24.0    9.46   0.10   1486     34     0.225   0.177    %10.09

      MEAN     119   27.0    9.47   0.08   1332    121     0.287   0.222    6.12
      S.DEV 12.85    10.04    .05    .08   315.92  125.49   .09     .07     3.77
      C V % 10.8     37.2     .5     115.1  23.7   104     34.4    35.2     61.7

------------------------------------------------------------------------------
```

COMPOUND =4 NITROPHENOL   THETA C = 1

PARAMETER =BOD   VOLUME-REACTOR = 3.13

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	444	12.0	9.65	2.37	460	48	2.976	2.895	1.00
01/19	319	19.1	9.79	2.55	350	28	2.851	2.680	1.00
01/21	257	2.3	9.65	2.92	380	12	2.085	2.066	1.00
01/24	339	8.2	9.65	2.29	440	50	2.375	2.318	1.00
01/26	318	3.3	9.50	3.13	340	0	2.839	2.809	1.00
01/28	258	2.0	9.07	2.92	540	18	1.384	1.374	1.00
01/31	261	1.0	9.07	3.06	560	6	1.351	1.345	1.00
02/02	301	1.4	9.36	3.05	470	6	1.915	1.906	1.00
02/04	310	4.2	8.93	2.89	500	20	1.769	1.745	1.00
02/07	287	5.8	9.22	2.92	490	16	1.725	1.690	1.00
02/09	356	10.9	9.22	3.13	290	0	3.616	3.505	1.00
02/11	319	6.9	9.22	2.74	430	26	2.185	2.138	1.00
02/14	337	9.1	8.93	2.94	680	22	1.414	1.376	1.00
02/16	348	9.2	9.07	3.01	610	12	1.653	1.609	1.00
02/18	291	3.3	9.65	3.07	700	6	1.282	1.267	1.00
02/21	277	1.6	9.65	3.13	470	0	1.817	1.807	1.00
02/23	342	5.5	9.22	2.97	420	10	2.399	2.360	1.00
02/25	290	7.1	9.65	1.64	450	84	1.987	1.938	1.00
02/28	306	12.8	9.65	0.00	320	204	2.948	2.825	0.51
03/02	306	9.2	9.50	0.00	310	104	2.996	2.906	0.98
03/04	270	6.4	9.65	2.50	590	52	1.411	1.377	1.00
03/07	358	4.0	9.65	2.88	550	20	2.007	1.984	1.00
03/09	350	6.9	9.36	0.26	520	164	2.013	1.973	1.00
MEAN	302	6.3	9.01	2.35	453	38	2.042	1.996	0.94
S.DEV	76.54	4.5	1.93	1.09	146.47	52.48	.76	.73	.22
C V %	25.3	71	21.5	46.7	32.3	138.7	37.4	36.8	23.8

COMPOUND =4 NITROPHENOL THETA C = 3

PARAMETER =BOD VOLUME-REACTOR = 3.14

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	444	13.0	9.07	0.65	860	40	1.491	1.448	3.01
01/19	319	6.3	9.50	0.75	880	30	1.097	1.075	3.00
01/21	257	1.0	9.65	1.04	1060	0	0.745	0.742	3.02
01/24	339	2.0	9.36	0.95	1230	14	0.822	0.817	3.00
01/26	318	3.7	8.64	1.04	830	0	1.054	1.042	3.02
01/28	258	2.2	9.65	0.94	1430	18	0.554	0.550	2.99
01/31	261	1.6	9.36	0.78	910	28	0.855	0.850	3.01
02/02	301	2.7	9.22	0.00	1020	140	0.866	0.859	2.48
02/04	310	3.4	9.79	0.36	1040	76	0.929	0.919	2.99
02/07	287	4.1	9.22	0.93	1420	20	0.593	0.585	3.00
02/09	356	1.8	9.22	1.04	1360	0	0.769	0.765	3.02
02/11	319	1.7	9.22	1.03	1390	2	0.674	0.670	3.01
02/14	337	2.9	9.36	0.97	1400	12	0.718	0.711	3.01
02/16	348	2.0	9.22	1.02	1350	4	0.757	0.753	3.01
02/18	291	4.0	9.07	1.02	1480	4	0.568	0.560	3.01
02/21	277	2.2	9.79	1.05	1200	0	0.720	0.714	2.99
02/23	342	1.9	9.22	0.26	680	60	1.477	1.469	2.99
02/25	290	1.5	9.22	0.00	670	172	1.271	1.264	1.33
02/28	306	3.9	9.79	0.00	650	224	1.468	1.449	0.93
03/02	306	7.3	9.65	0.00	340	368	2.766	2.700	0.30
03/04	270	8.6	9.22	0.31	530	44	1.496	1.448	2.99
03/07	358	6.8	9.22	0.34	1050	84	1.061	0.982	2.99
03/09	350	4.2	9.07	0.00	790	196	1.280	1.264	1.40
MEAN	302	3.7	8.95	0.60	982	64	0.999	0.985	2.52
S.DEV	76.54	2.9	1.92	.43	381.9	92.7	.52	.5	.94
C V %	25.3	78.3	21.5	72	38.8	144.8	52.3	51.6	37.6

COMPOUND =4 NITROPHENOL THETA C = 10

PARAMETER =BOD VOLUME-REACTOR = 3.1

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	444	5.5	8.93	0.19	2240	30	0.571	0.564	%10.10
01/19	319	3.5	9.07	0.28	2280	8	0.409	0.405	9.97
01/21	257	1.6	9.79	0.27	2150	10	0.377	0.375	9.86
01/24	339	2.0	9.65	0.26	2410	12	0.438	0.435	%10.11
01/26	318	1.8	9.22	0.31	2150	0	0.440	0.437	%10.00
01/28	258	1.5	9.65	0.24	2310	18	0.348	0.346	9.89
01/31	261	1.4	9.36	0.29	2880	6	0.274	0.272	%10.04
02/02	301	2.7	9.50	0.00	2760	270	0.334	0.331	3.34
02/04	310	2.2	9.22	0.00	2150	320	0.429	0.426	2.26
02/07	287	2.5	8.93	0.06	1130	376	0.732	0.725	1.04
02/09	356	3.8	9.80	0.00	420	104	2.680	2.651	1.28
02/11	319	2.2	9.36	0.00	720	74	1.338	1.329	3.22
02/14	337	3.3	9.07	0.15	1100	20	0.896	0.888	9.93
02/16	348	2.2	9.36	0.00	1100	76	0.955	0.949	4.79
02/18	291	2.8	9.07	0.00	1170	120	0.728	0.721	3.33
02/21	277	1.8	9.07	0.00	1050	146	0.772	0.767	2.46
02/23	342	2.2	8.93	0.25	1160	8	0.849	0.844	%10.00
02/25	290	2.4	9.22	0.24	1240	10	0.696	0.690	9.92
02/28	306	1.8	9.36	0.00	1300	52	0.711	0.707	8.28
03/02	306	3.6	9.07	0.00	920	440	0.973	0.962	0.71
03/04	270	4.3	8.93	0.31	1120	0	0.694	0.683	%10.00
03/07	358	5.4	9.65	0.00	1490	108	0.748	0.737	4.43
03/09	350	1.8	9.50	0.12	1370	28	0.783	0.779	9.95
MEAN	302	2.6	8.90	0.12	1526	93	0.716	0.709	6.45
S.DEV	76.54	1.26	1.91	.13	748.84	128.03	.5	.5	3.92
C V %	25.3	48.8	21.5	107.8	49	137.4	70.6	70.5	60.7

```
---------------------------------------------------------------------------

    COMPOUND =4 NITROPHENOL             THETA C = 1

    PARAMETER =COD                      VOLUME-REACTOR = 3.13

-------------------------------------------------------------------------------
    DATE    SI      SE       F     FW      X      XE       FSI   F(SI-SE)  TC
    1983                                                    XV     XV
-------------------------------------------------------------------------------

    01/17   %1060   %113.0   9.65  2.37   460    48     7.104  6.347      1.00
    01/26   460     16.0    9.50  3.13   340      0     4.106  3.964     1.00
    02/04   408     20.0    8.93  2.89   500     20     2.328  2.214     1.00
    02/11   465     53.0    9.22  2.74   430     26     3.185  2.822     1.00
    02/18   580     81.0    9.65  3.07   700      6     2.555  2.198     1.00
    02/25   398     47.0    9.65  1.64   450     84     2.727  2.405     1.00
    03/04   510     28.0    9.65  2.50   590     52     2.665  2.519     1.00
    03/09   460     38.0    9.36  0.26   520    164     2.645  2.427     1.00

    MEAN    482     44.0    8.40  2.07   443     44     3.035  2.766     0.89
    S.DEV 271.7     35.01    3.16  1.18  195    52.78    1.87   1.68       .33
    C V % 56.3      79.5     37.6  57.4  43.9  118.7   61.7   61        37.5

---------------------------------------------------------------------------
```

```
------------------------------------------------------------------------

     COMPOUND =4 NITROPHENOL           THETA C = 3

     PARAMETER =COD                    VOLUME-REACTOR = 3.14

----------------------------------------------------------------------------
     DATE    SI      SE       F    FW      X      XE      FSI   F(SI-SE)  TC
     1983                                                  XV      XV
----------------------------------------------------------------------------

     01/17   %1060    50.0    9.07  0.65   860     40     3.560  3.392     3.01
     01/26   460     18.0    8.64  1.04   830      0     1.525  1.465     3.02
     02/04   408     17.0    9.79  0.36  1040     76     1.223  1.172     2.99
     02/11   465     43.0    9.22  1.03  1390      2     0.982  0.891     3.01
     02/18   580     51.0    9.07  1.02  1480      4     1.132  1.032     3.01
     02/25   398     32.0    9.22  0.00   670    172     1.744  1.604     1.33
     03/04   510     27.0    9.22  0.31   530     44     2.826  2.676     2.99
     03/09   460     30.0    9.07  0.00   790    196     1.682  1.572     1.40

     MEAN    482     29.8    8.14  0.49   843     59     1.630  1.534     2.31
     S.DEV 271.7     16.71    3.06  .45  445.19  75.53  1.04    .99      1.12
     C V % 56.3      56.1     37.6  93.2  52.7  127.3  63.8    64.8      48.5

------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------

     COMPOUND =4 NITROPHENOL              THETA C = 10

     FARAMETER =COD                       VOLUME-REACTOR = 3.1

------------------------------------------------------------------------------------
     DATE    SI      SE       F    FW      X      XE      FSI   F(SI-SE)  TC
     1983                                                  XV      XV
------------------------------------------------------------------------------------

     01/17   %1060    39.0    8.93  0.19  2240     30     1.363  1.313     %10.10
     01/26   460    16.0    9.22  0.31  2150      0     0.636  0.614    %10.00
     02/04   408    11.0    9.22  0.00  2150    320     0.564  0.549    2.26
     02/11   465    50.0    9.36  0.00   720     74     1.950  1.740    3.22
     02/18   580    52.0    9.07  0.00  1170    120     1.450  1.320    3.33
     02/25   398    26.0    9.22  0.24  1240     10     0.955  0.892    9.92
     03/04   510     5.0    8.93  0.31  1120      0     1.312  1.299    %10.00
     03/09   460    18.0    9.50  0.12  1370     28     1.029  0.989    9.95

     MEAN    482    24.1    8.16  0.13  1351     65     1.029  0.969    6.53
     S.DEV 271.7    19.02    3.06  .13  740.71  103.93  .57    .52      4.21
     C V % 56.3     78.8     37.5  104.6  54.8   160.7  55.9  54       64.5

--------------------------------------------------------------------------------
```

COMPOUND =4 NITROPHENOL THETA C = 1

PARAMETER =TOC VOLUME-REACTOR = 3.13

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	218	67.0	9.65	2.37	460	48	1.461	1.012	1.00
01/19	126	42.0	9.79	2.55	350	28	1.126	0.751	1.00
01/21	128	24.0	9.65	2.92	380	12	1.039	0.844	1.00
01/24	144	39.0	9.65	2.92	440	50	1.009	0.736	0.85
01/26	157	17.0	9.50	3.13	340	0	1.402	1.250	1.00
01/28	143	21.0	9.07	2.92	540	18	0.767	0.655	1.00
01/31	95	25.0	9.07	3.06	560	6	0.492	0.362	1.00
02/02	120	56.0	9.36	3.05	470	6	0.764	0.407	1.00
02/04	157	34.0	8.93	2.89	500	20	0.896	0.702	1.00
02/07	125	32.0	9.22	2.92	490	16	0.751	0.559	1.00
02/09	139	30.5	9.22	3.13	290	0	1.412	1.102	1.00
02/11	146	21.5	9.22	2.74	430	26	1.000	0.853	1.00
02/14	145	32.0	8.93	2.94	680	22	0.608	0.474	1.00
02/16	135	25.0	9.07	3.01	610	12	0.641	0.523	1.00
02/18	143	26.0	9.65	3.07	700	6	0.630	0.515	1.00
02/21	138	29.0	9.65	3.13	470	0	0.905	0.715	1.00
02/23	151	27.0	9.22	2.97	420	10	1.059	0.870	1.00
02/25	142	30.0	9.65	1.64	450	84	0.973	0.767	1.00
02/28	137	28.0	9.65	0.00	320	204	1.320	1.050	0.51
03/02	166	21.0	9.50	0.00	310	104	1.625	1.420	0.98
03/04	142	22.0	9.65	2.50	590	52	0.742	0.627	1.00
03/07	124	11.0	9.65	2.88	550	20	0.695	0.633	1.00
03/09	106	23.0	9.36	0.26	520	164	0.610	0.477	1.00
MEAN	134	28.5	9.01	2.37	453	38	0.914	0.721	0.93
S.DEV	36.63	13.4	1.93	1.1	146.47	52.48	.36	.3	.22
C V %	27.2	47	21.5	46.4	32.3	138.7	39.9	42.5	24

COMPOUND =4 NITROPHENOL THETA C = 3

PARAMETER =TOC VOLUME-REACTOR = 3.14

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	218	26.0	9.07	0.65	860	40	0.732	0.645	3.01
01/19	126	44.0	9.50	0.75	880	30	0.433	0.282	3.00
01/21	128	23.0	9.65	1.04	1060	0	0.371	0.304	3.02
01/24	144	34.0	9.36	0.95	1230	14	0.349	0.267	3.00
01/26	157	22.0	8.64	1.04	830	0	0.520	0.448	3.02
01/28	143	19.0	9.65	0.94	1430	18	0.307	0.266	2.99
01/31	95	28.0	9.36	0.78	910	28	0.311	0.219	3.01
02/02	120	44.0	9.22	0.00	1020	140	0.345	0.219	2.48
02/04	157	41.0	9.79	0.36	1040	76	0.471	0.348	2.99
02/07	125	34.0	9.22	0.93	1420	20	0.258	0.188	3.00
02/09	139	31.5	9.22	1.04	1360	0	0.300	0.232	3.02
02/11	146	17.0	9.22	1.03	1390	2	0.308	0.273	3.01
02/14	145	37.0	9.36	0.97	1400	12	0.309	0.230	3.01
02/16	135	19.5	9.22	1.02	1350	4	0.294	0.251	3.01
02/18	143	22.0	9.07	1.02	1480	4	0.279	0.236	3.01
02/21	138	32.0	9.79	1.05	1200	0	0.359	0.275	2.99
02/23	151	27.0	9.22	0.26	680	60	0.652	0.535	2.99
02/25	142	25.0	9.22	0.00	670	172	0.622	0.513	1.33
02/28	137	26.0	9.79	0.00	650	224	0.657	0.532	0.93
03/02	166	29.0	9.65	0.00	340	368	1.500	1.238	0.30
03/04	142	22.0	9.22	0.31	530	44	0.787	0.665	2.99
03/07	124	24.0	9.22	0.34	1050	84	0.347	0.280	2.99
03/09	106	19.0	9.07	0.00	790	196	0.388	0.318	1.40
MEAN	134	26.9	8.95	0.60	982	64	0.454	0.365	2.52
S.DEV	36.63	9.64	1.92	.43	381.9	92.7	.28	.24	.94
C V %	27.2	35.8	21.5	72	38.8	144.8	62.6	66.2	37.6

```
----------------------------------------------------------------------------------

     COMPOUND =4 NITROPHENOL                THETA C = 10

     PARAMETER =TOC                         VOLUME-REACTOR = 3.1

--------------------------------------------------------------------------------------
     DATE    SI      SE       F     FW      X       XE       FSI    F(SI-SE)   TC
     1983                                                     XV      XV
--------------------------------------------------------------------------------------

     01/17   218     23.0    8.93   0.19   2240     30      0.280   0.251      %10.10
     01/19   126     19.0    9.07   0.28   2280      8      0.162   0.137      9.97
     01/21   128     15.0    9.79   0.27   2150     10      0.188   0.166      9.86
     01/24   144     31.0    9.65   0.26   2410     12      0.186   0.146      %10.11
     01/26   157     14.0    9.22   0.31   2150      0      0.217   0.198      %10.00
     01/28   143     16.0    9.65   0.24   2310     18      0.193   0.171      9.89
     01/31    95     22.0    9.36   0.29   2880      6      0.100   0.077      %10.04
     02/02   120     37.0    9.50   0.00   2760    270      0.133   0.092      3.34
     02/04   157     26.0    9.22   0.00   2150    320      0.217   0.181      2.26
     02/07   125     28.5    8.93   0.00   1130    376      0.319   0.246      1.04
     02/09   139     17.0    9.80   0.00    420    104      1.046   0.918      1.28
     02/11   146     18.0    9.36   0.00    720     74      0.612   0.537      3.22
     02/14   145     28.0    9.07   0.15   1100     20      0.386   0.311      9.93
     02/16   143     24.0    9.07   0.00   1170    120      0.358   0.298      3.33
     02/18   143     24.0    9.07   0.00   1170    120      0.358   0.298      3.33
     02/21   138     29.0    9.07   0.00   1050    146      0.385   0.304      2.46
     02/23   151     29.0    8.93   0.25   1160      8      0.375   0.303      %10.00
     02/25   142     32.0    9.22   0.24   1240     10      0.341   0.264      9.92
     02/28   137     30.0    9.36   0.00   1300     52      0.318   0.249      8.28
     03/02   166     24.0    9.07   0.00    920    440      0.528   0.452      0.71
     03/04   142     21.0    8.93   0.31   1120      0      0.365   0.311      %10.00
     03/07   124     21.0    9.65   0.00   1490    108      0.259   0.215      4.43
     03/09   106     13.0    9.50   0.12   1370     28      0.237   0.208      9.95

     MEAN     135    22.6    8.89   0.12   1529     95      0.315   0.264      6.39
     S.DEV 36.67     7.89     1.91   .13   747.25  128.09   .2      .18        3.95
     C V % 27.2      34.9     21.5  107.8   48.8   134.8   65.1    68.3        61.9
----------------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------

    COMPOUND =2-4-6 TRICHLOROPHENOL     THETA C = 1

    PARAMETER =BOD                      VOLUME-REACTOR = 3.1

-------------------------------------------------------------------------------
    DATE    SI     SE      F    FW     X      XE     FSI   F(SI-SE)  TC
    1983                                              XV      XV
-------------------------------------------------------------------------------

    01/17   330    1.6   9.50  2.99   690    12    1.466  1.459    1.00
    01/19   310    1.5   9.50  3.07   740     4    1.284  1.278    1.00
    01/21   231   11.9   9.50  2.97   610    12    1.161  1.101    1.00
    01/24   332   22.3   9.50  3.05   480     4    2.120  1.977    1.00
    01/26   366   24.2   9.50  2.84   610    24    1.839  1.717    1.00
    01/28   334   11.8   9.50  2.71   770    44    1.329  1.282    1.00
    01/31   341    5.2   9.50  2.68   780    48    1.340  1.319    1.00
    02/02   347    5.6   9.50  2.68   840    52    1.266  1.246    1.00
    02/04   366    5.1   9.50  2.70   880    52    1.275  1.257    1.00
    02/07   361    8.2   9.50  3.10  1650    24    0.670  0.655    0.97
    02/09   396    5.7   9.50  2.29   570    64    2.129  2.098    1.00
    02/11   375    8.6   9.50  2.29   570    64    2.016  1.970    1.00
    02/14   394   16.8   9.50  2.48   500    48    2.415  2.312    0.98
    02/16   420   18.9   9.50  2.41   490    48    2.627  2.509    1.00
    02/18   337   18.0   9.50  2.50   560    48    1.844  1.746    1.00
    02/21   292   12.6   8.93  2.25   330    42    2.549  2.439    1.00
    02/23   396   16.2   9.50  2.44   430    40    2.822  2.707    1.00
    02/25   385   19.1   9.50  2.34   450    48    2.622  2.492    1.00
    02/28   360    8.7   9.50  2.62   520    36    2.122  2.070    1.00
    03/02   375   18.9   9.50  2.63   580    40    1.981  1.882    1.00
    03/04   312   15.9   9.50  2.39   440    44    2.173  2.062    1.00
    03/07   384   15.5   9.50  2.39   440    44    2.674  2.567    1.00
    03/09   379   19.2   9.50  2.53   440    36    2.640  2.506    1.00

    MEAN    353   12.7   9.48  2.62   625    38    1.929  1.854    1.00
    S.DEV 41.47   6.66    .11   .27  266.4  17.1    .6     .56     0
    C V % 11.7   52.5    1.2   10.2  42.6  44.8   31.3   30.6      .6

---------------------------------------------------------------------------
```

COMPOUND =2-4-6 TRICHLOROPHENOL THETA C = 3

PARAMETER =BOD VOLUME-REACTOR = 3.1

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	330	2.0	9.22	0.93	990	12	0.991	0.985	3.01
01/19	310	0.7	9.22	0.97	960	8	0.960	0.958	2.98
01/21	231	5.1	9.22	1.00	940	4	0.731	0.715	3.00
01/24	332	0.7	9.22	1.00	900	4	1.097	1.095	2.99
01/26	366	2.9	9.22	1.03	1020	0	1.067	1.059	3.01
01/28	334	2.0	9.22	0.89	1130	20	0.879	0.874	2.99
01/31	341	0.7	9.22	0.93	1310	16	0.774	0.773	3.01
02/02	347	2.4	9.22	0.89	1350	24	0.764	0.759	2.99
02/04	366	2.0	9.22	0.93	1270	16	0.857	0.852	3.00
02/07	361	3.1	9.22	1.03	1260	0	0.852	0.845	3.01
02/09	396	3.7	9.22	0.98	1130	8	1.042	1.033	2.99
02/11	375	2.2	9.22	0.96	1330	12	0.839	0.834	3.00
02/14	394	5.6	9.22	0.98	1240	8	0.945	0.932	3.00
02/16	420	6.3	9.22	0.98	1160	8	1.077	1.061	2.99
02/18	337	2.0	9.22	0.96	1420	12	0.706	0.702	3.01
02/21	292	3.2	8.64	0.97	920	8	0.885	0.875	2.99
02/23	396	5.9	9.22	0.86	990	20	1.190	1.172	3.01
02/25	385	6.3	9.22	0.66	1300	56	0.881	0.866	3.01
02/28	360	6.5	9.22	0.87	950	60	1.127	1.107	2.22
03/02	375	14.3	9.22	0.54	980	56	1.138	1.095	2.99
03/04	312	8.8	9.22	0.74	1140	40	0.814	0.791	2.99
03/07	384	11.8	9.22	0.81	1040	28	1.098	1.064	2.99
03/09	379	9.9	9.22	0.85	1290	28	0.874	0.851	3.00
MEAN	353	4.7	9.19	0.90	1131	19	0.939	0.926	2.96
S.DEV	41.47	3.66	.12	.12	163.1	17.81	.14	.13	.16
C V %	11.7	77.9	1.3	13.3	14.4	91.4	15.1	14.9	5.4

```
-----------------------------------------------------------------------

     COMPOUND =2-4-6 TRICHLOROPHENOL     THETA C = 10

     PARAMETER =BOD                      VOLUME-REACTOR = 3.3

--------------------------------------------------------------------------
     DATE    SI      SE       F     FW      X      XE      FSI   F(SI-SE)  TC
     1983                                                   XV      XV
--------------------------------------------------------------------------

     01/17   330     1.4    9.79   0.21   1840     24    0.532   0.530     9.85
     01/19   310     0.7    9.79   0.00   1820    136    0.505   0.504     4.51
     01/21   231     0.6    9.79   0.16   1620     28    0.423   0.422    %10.11
     01/24   332     1.9    9.79   0.26   1580     12    0.623   0.620     9.93
     01/26   366     2.5    9.79   0.03   1940     60    0.560   0.556     9.94
     01/28   334     1.7    9.79   0.10   2030     48    0.488   0.486    %10.03
     01/31   341     1.9    9.79   0.10   1950    204    0.519   0.516     2.96
     02/02   347     1.8    9.79   0.10   1880    176    0.548   0.545     3.28
     02/04   366     0.6    9.79   0.10   1470    128    0.739   0.737     3.50
     02/07   361     4.4    9.79   0.10   2580    116    0.415   0.410     6.16
     02/09   396     5.3    9.79   0.15   1880     36    0.625   0.617     9.86
     02/11   375     5.2    9.79   0.10   1750    152    0.636   0.627     3.50
     02/14   394     7.9    9.79   0.10   1520    328    0.769   0.754     1.51
     02/16   420    12.3    9.79   0.10   1510    188    0.825   0.801     2.53
     02/18   337     2.8    9.79   0.10   1650     72    0.606   0.601     6.31
     02/21   292     6.2    8.93   0.10   1920    132    0.412   0.403     4.67
     02/23   396    19.2    9.79   0.10   1460    276    0.805   0.766     1.71
     02/25   385     4.9    9.79   0.10   1190    164    0.960   0.948     2.30
     02/28   360     4.9    9.79   0.10   1210    140    0.883   0.871     2.70
     03/02   375    11.7    9.79   0.10   1420    276    0.783   0.759     1.66
     03/04   312     7.0    9.79   0.26   1690     12    0.548   0.535    %10.07
     03/07   384     7.5    9.79   0.24   1750     16    0.651   0.638    %10.08
     03/09   379     9.9    9.79   0.17   1950     32    0.577   0.562    %10.07

     MEAN    353     5.3    9.75   0.13   1722    120    0.627   0.618     5.97
     S.DEV 41.47    4.59     .17    .06  300.58  92.51   .15     .14      3.5
     C V % 11.7     86.3     1.8   52.2   17.4   77.2    24.3    23.8      58.8
-----------------------------------------------------------------------
```

```
---------------------------------------------------------------------------

    COMPOUND =2-4-6 TRICHLOROPHENOL    THETA C = 1

    PARAMETER =COD                     VOLUME-REACTOR = 3.1

-------------------------------------------------------------------------------
    DATE    SI      SE        F    FW      X      XE      FSI    F(SI-SE)  TC
    1983                                                  XV       XV
-------------------------------------------------------------------------------

    01/17   330    10.0    9.50  2.97    610     12     1.658  1.608     1.00
    01/26   630     0.0    9.50  2.84    610     24     3.165  3.165     1.00
    02/04   500    17.0    9.50  2.70    880     52     1.741  1.682     1.00
    02/11   600    75.0    9.50  2.29    570     64     3.226  2.823     1.00
    02/18   465    %118.0    9.50  2.50    560     48     2.545  1.899     1.00
    02/25   482    40.0    9.50  2.34    450     48     3.282  3.010     1.00
    03/04   510    50.0    9.50  2.39    440     44     3.552  3.204     1.00
    03/09   520    32.0    9.50  2.53    440     36     3.622  3.399     1.00

    MEAN    505    42.8    9.50  2.57    570     41     2.849  2.599     1.00
    S.DEV 90.77    38.62   0      .24   145.2  16.52     .78    .74      0
    C V % 17.9     90.3    0      9.5   25.4   40.3     27.3   28.5      0

---------------------------------------------------------------------------
```

COMPOUND =2-4-6 TRICHLOROPHENOL THETA C = 3

PARAMETER =COD VOLUME-REACTOR = 3.1

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	330	10.0	9.22	0.93	990	12	0.991	0.961	3.01
01/26	630	0.0	9.22	1.03	1020	0	1.837	1.837	3.01
02/04	500	13.0	9.22	0.93	1270	16	1.171	1.141	3.00
02/11	600	46.0	9.22	0.96	1330	12	1.342	1.239	3.00
02/18	465	33.0	9.22	0.96	1420	12	0.974	0.905	3.01
02/25	482	42.0	9.22	0.66	1300	56	1.103	1.007	3.01
03/04	510	44.0	9.22	0.74	1140	40	1.331	1.216	2.99
03/09	520	19.0	9.22	0.85	1290	28	1.199	1.155	3.00
MEAN	505	25.9	9.22	0.88	1220	22	1.243	1.183	3.00
S.DEV	90.77	17.64	0	.12	153.62	18.26	.27	.29	0
C V %	17.9	68.1	0	14.1	12.5	83	22.1	24.5	.2

```
------------------------------------------------------------------------------

   COMPOUND =2-4-6 TRICHLOROPHENOL    THETA C = 10

   PARAMETER =COD                     VOLUME-REACTOR = 3.3

----------------------------------------------------------------------------------
   DATE    SI     SE      F    FW     X      XE     FSI   F(SI-SE)  TC
   1983                                              XV      XV
----------------------------------------------------------------------------------

   01/17   330   21.0   9.79  0.16  1620     28    0.604  0.566     %10.11
   01/26   630   10.0   9.79  0.03  1940     60    0.963  0.948     9.94
   02/04   500   13.0   9.79  0.10  1470    128    1.009  0.983     3.50
   02/11   600   37.0   9.79  0.10  1750    152    1.017  0.954     3.50
   02/18   465   87.0   9.79  0.10  1650     72    0.836  0.680     6.31
   02/25   482   28.0   9.79  0.10  1190    164    1.202  1.132     2.30
   03/04   510   32.0   9.79  0.26  1690     12    0.895  0.839     %10.07
   03/09   520   19.0   9.79  0.17  1950     32    0.791  0.762     %10.07

   MEAN    505   30.9   9.79  0.13  1658     81    0.915  0.858     6.98
   S.DEV 90.77   24.46   0     .06  247.89  59.31  .17     .18      3.46
   C V % 17.9    79.2    0     53.8  14.9  73.2   19.4    21.3      49.7

------------------------------------------------------------------------------
```

COMPOUND =2-4-6 TRICHLOROPHENOL THETA C = 1

PARAMETER =TOC VOLUME-REACTOR = 3.1

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	115	14.0	9.50	2.99	690	12	0.511	0.449	1.00
01/19	130	16.0	9.50	3.07	740	4	0.538	0.472	1.00
01/21	116	20.0	9.50	2.97	610	12	0.583	0.482	1.00
01/24	169	25.0	9.50	3.05	480	4	1.079	0.919	1.00
01/26	162	18.0	9.50	2.84	610	24	0.814	0.723	1.00
01/28	153	37.0	9.50	2.71	770	44	0.609	0.462	1.00
01/31	148	37.0	9.50	2.68	780	48	0.581	0.436	1.00
02/02	161	42.0	9.50	2.68	840	52	0.587	0.434	1.00
02/04	149	38.0	9.50	2.70	880	52	0.519	0.387	1.00
02/07	156	35.0	9.50	3.10	1650	24	0.290	0.225	0.97
02/09	164	37.0	9.50	2.85	750	28	0.670	0.519	1.00
02/11	153	38.0	9.50	2.29	570	64	0.823	0.618	1.00
02/14	165	41.0	9.50	2.48	500	48	1.011	0.760	0.98
02/16	167	59.0	9.50	2.41	490	48	1.044	0.675	1.00
02/18	153	43.0	9.50	2.50	560	48	0.837	0.602	1.00
02/21	154	50.0	8.93	2.25	330	42	1.344	0.908	1.00
02/23	160	53.0	9.50	2.44	430	40	1.140	0.763	1.00
02/25	159	42.0	9.50	2.34	450	48	1.083	0.797	1.00
02/28	159	50.0	9.50	2.62	520	36	0.937	0.642	1.00
03/02	162	48.0	9.50	2.63	580	40	0.856	0.602	1.00
03/04	161	50.0	9.50	2.39	440	44	1.121	0.773	1.00
03/07	151	73.0	9.50	2.39	440	44	1.052	0.543	1.00
03/09	152	58.0	9.50	2.53	440	36	1.059	0.655	1.00
MEAN	153	40.2	9.48	2.65	633	37	0.830	0.602	1.00
S.DEV	14.34	14.68	.11	.26	267.36	16.26	.26	.17	0
C V %	9.3	36.5	1.2	9.9	42.2	44.4	32.4	28.9	.6

COMPOUND =2-4-6 TRICHLOROPHENOL   THETA C = 3

PARAMETER =TOC   VOLUME-REACTOR = 3.1

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	115	19.0	9.22	0.93	990	12	0.345	0.288	3.01
01/19	130	23.0	9.22	0.97	960	8	0.403	0.331	2.98
01/21	116	23.0	9.22	1.00	940	4	0.367	0.294	3.00
01/24	169	32.0	9.22	1.00	900	4	0.558	0.453	2.99
01/26	162	19.0	9.22	1.03	1020	0	0.472	0.417	3.01
01/28	153	26.0	9.22	0.89	1130	20	0.403	0.334	2.99
01/31	148	25.0	9.22	0.93	1310	16	0.336	0.279	3.01
02/02	161	39.0	9.22	0.89	1350	24	0.355	0.269	2.99
02/04	149	42.0	9.22	0.93	1270	16	0.349	0.251	3.00
02/07	156	44.0	9.22	1.03	1260	0	0.368	0.264	3.01
02/09	164	43.0	9.22	0.98	1130	8	0.432	0.318	2.99
02/11	153	37.0	9.22	0.96	1330	12	0.342	0.259	3.00
02/14	165	31.0	9.22	0.98	1240	8	0.396	0.321	3.00
02/16	167	67.0	9.22	0.98	1160	8	0.428	0.256	2.99
02/18	153	48.0	9.22	0.96	1420	12	0.320	0.220	3.01
02/21	154	32.0	8.64	0.97	920	8	0.467	0.370	2.99
02/23	160	37.0	9.22	0.86	990	20	0.481	0.370	3.01
02/25	159	32.0	9.22	0.66	1300	56	0.364	0.291	3.01
02/28	159	38.0	9.22	0.87	950	60	0.498	0.379	2.22
03/02	162	24.0	9.22	0.54	980	56	0.492	0.419	2.99
03/04	161	38.0	9.22	0.74	1140	40	0.420	0.321	2.99
03/07	151	56.0	9.22	0.81	1040	28	0.432	0.272	2.99
03/09	152	42.0	9.22	0.85	1290	28	0.350	0.254	3.00
MEAN	153	35.5	9.19	0.90	1131	19	0.408	0.314	2.96
S.DEV	14.34	11.78	.12	.12	163.1	17.81	.06	.06	.16
C V %	9.3	33.1	1.3	13.3	14.4	91.4	15.5	19.6	5.4

COMPOUND =2-4-6 TRICHLOROPHENOL   THETA C = 10

PARAMETER =TOC   VOLUME-REACTOR = 3.3

DATE 1983	SI	SE	F	FW	X	XE	FSI XV	F(SI-SE) XV	TC
01/17	115	40.0	9.79	0.21	1840	24	0.185	0.121	9.85
01/19	130	21.0	9.79	0.00	1820	136	0.212	0.178	4.51
01/21	116	13.0	9.79	0.16	1620	28	0.212	0.189	%10.11
01/24	169	60.0	9.79	0.26	1580	12	0.317	0.205	9.93
01/26	162	23.0	9.79	0.03	1940	60	0.248	0.213	9.94
01/28	153	34.0	9.79	0.10	2030	48	0.224	0.174	%10.03
01/31	148	32.0	9.79	0.10	1950	204	0.225	0.176	2.96
02/02	161	37.0	9.79	0.10	1880	176	0.254	0.196	3.28
02/04	149	40.0	9.73	0.10	1470	128	0.301	0.220	3.50
02/07	156	36.0	9.79	0.10	2580	116	0.179	0.138	6.16
02/09	164	41.0	9.79	0.15	1880	36	0.259	0.194	9.86
02/11	153	21.0	9.79	0.10	1750	152	0.259	0.224	3.50
02/14	165	28.0	9.79	0.10	1520	328	0.322	0.267	1.51
02/16	167	64.0	9.79	0.10	1510	188	0.328	0.202	2.53
02/18	153	39.0	9.79	0.10	1650	72	0.275	0.205	6.31
02/21	154	30.0	8.93	0.10	1920	132	0.217	0.175	4.67
02/23	160	32.0	9.79	0.10	1460	276	0.325	0.260	1.71
02/25	159	27.0	9.79	0.10	1190	164	0.396	0.329	2.30
02/28	159	27.0	9.79	0.10	1210	140	0.390	0.324	2.70
03/02	162	20.0	9.79	0.10	1420	276	0.338	0.297	1.66
03/04	161	23.0	9.79	0.26	1690	12	0.283	0.242	%10.07
03/07	151	40.0	9.79	0.24	1750	16	0.256	0.188	%10.08
03/09	152	32.0	9.79	0.17	1950	32	0.231	0.183	%10.07
MEAN	153	33.0	9.75	0.13	1722	120	0.271	0.213	5.97
S.DEV	14.34	11.92	.17	.06	300.58	92.51	.05	.05	3.5
C V %	9.3	36	1.8	52.2	17.4	77.2	22.1	24.8	58.8

```
---------------------------------------------------------------------------

   COMPOUND =COMBINED                  THETA C = 1

   PARAMETER =BOD                      VOLUME-REACTOR = 2.949

-------------------------------------------------------------------------------
   DATE    SI     SE       F     FW      X      XE      FSI   F(SI-SE)  TC
   1983                                                  XV     XV
-------------------------------------------------------------------------------

   01/17   297    3.6    8.64  2.63    450     24     1.934  1.910     1.00
   01/24   402    3.5    8.93  2.51    410     28     2.969  2.943     1.00
   01/26   332    2.0    9.22  2.95    400      0     2.595  2.579     1.00
   01/28   301    1.5    9.07  2.72    600     22     1.543  1.535     1.00
   01/31   373    1.0    9.07  2.90    540      4     2.124  2.119     1.00
   02/02   336    1.5    9.22  2.83    530     10     1.982  1.973     1.00
   02/04   378    1.9    9.07  2.87    460      6     2.527  2.515     1.00
   02/07   378    3.3    8.64  2.95    590      0     1.877  1.861     1.00
   02/09   390    2.9    9.07  2.95    310      0     3.869  3.841     1.00
   02/11   381    1.9    9.22  2.95    540      0     2.206  2.195     1.00
   02/14   380    9.2    8.78  2.40    750     64     1.508  1.472     1.00
   02/16   338    4.8    8.64  1.64    590    110     1.678  1.655     1.00
   02/18   330    3.9    9.07  0.79    460    120     2.206  2.180     1.00
   02/21   317    7.8    8.64  1.98    590     86     1.574  1.535     1.00
   02/23   326    8.4    8.64  2.48    370     28     2.581  2.515     1.00
   02/25   358    5.6    8.78  2.03    410     56     2.600  2.559     1.00
   02/28   322    4.2    8.78  0.83    390    104     2.458  2.426     1.00
   03/02   184    9.5    8.78  1.79    290     48     1.889  1.792     1.00
   03/04   293    4.8    8.93  1.04    330     80     2.689  2.645     1.00
   03/07   357   11.5    8.93  1.67    410     72     2.637  2.552     1.00

   MEAN    339    4.6    8.91  2.25    471     43     2.272  2.240     1.00
   S.DEV 48.84   3.07     .21   .73  117.46  40.69    .57    .57      0
   C V % 14.4    66.2     2.3   32.7  24.9   94.4    25.2   25.4      0

---------------------------------------------------------------------------
```

```
----------------------------------------------------------------------------------

        COMPOUND =COMBINED                     THETA C = 3

        PARAMETER =BOD                         VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------------
        DATE     SI      SE       F     FW       X       XE       FSI    F(SI-SE)  TC
        1983                                                       XV       XV
----------------------------------------------------------------------------------------

        01/17    297     2.1     9.22   1.03     930      0      0.950   0.943      3.01
        01/24    402     1.7     9.22   0.93     990     12      1.208   1.203      3.01
        01/26    332     6.2     9.22   1.03    1150      0      0.859   0.843      3.01
        01/28    301     1.9     9.22   0.98    1180      8      0.759   0.754      2.99
        01/31    373    91.9     9.22   0.99    1560      8      0.711   0.536      3.00
        02/02    336     2.6     9.22   0.99    1390      8      0.719   0.713      2.99
        02/04    378     3.1     9.22   0.95    1510     16      0.745   0.738      2.99
        02/07    378     4.2     9.22   1.03    1860      0      0.604   0.598      3.01
        02/09    390     2.9     9.22   0.99    1650      8      0.703   0.698      3.01
        02/11    381     2.3     9.22   0.94    1460     16      0.776   0.771      3.01
        02/14    380     3.2     9.22   0.99    1640      8      0.689   0.683      3.01
        02/16    338     4.0     9.22   1.01    1450      4      0.693   0.685      3.00
        02/18    330     1.5     9.22   0.96    1870     16      0.525   0.522      3.01
        02/21    317     1.8     9.22   1.01    1350      4      0.698   0.694      3.00
        02/23    326     3.4     9.22   0.98    1200      8      0.808   0.800      3.00
        02/25    358     1.9     9.22   1.01    1260      4      0.845   0.841      2.99
        02/28    322     3.5     9.22   1.01    1270      4      0.754   0.746      2.99
        03/02    184     2.4     9.22   1.01    1410      4      0.388   0.383      3.00
        03/04    293     0.5     9.22   0.96    1700     16      0.513   0.512      2.99
        03/07    357     2.4     9.22   1.01    1450      4      0.732   0.727      3.00

        MEAN     339     7.2     9.22   0.99    1414      7      0.734   0.720      3.00
        S.DEV 48.84    19.97     0       .02    257.93  5.39      .16     .17       0
        C V % 14.4    278.4      0      3       18.2   72.8      23      24.1       .2

----------------------------------------------------------------------------------
```

```
----------------------------------------------------------------------------

     COMPOUND =COMBINED                   THETA C = 10

     PARAMETER =BOD                       VOLUME-REACTOR = 3.13

--------------------------------------------------------------------------------
     DATE     SI      SE      F     FW      X      XE      FSI   F(SI-SE)  TC
     1983                                                   XV      XV
--------------------------------------------------------------------------------

     01/17    297     2.1    9.38  0.31   2120      0     0.420  0.417     %10.10
     01/24    402     1.4    9.38  0.25   1990     14     0.605  0.603     9.96
     01/26    332     1.9    9.38  0.31   2000      0     0.497  0.495     %10.10
     01/28    301     1.0    9.38  0.21   2008     22     0.449  0.448     %10.08
     01/31    373     1.7    9.40  0.31   2018      0     0.555  0.553     %10.10
     02/02    336     2.2    9.40  0.26   2112      8     0.478  0.475     %10.62
     02/04    378     2.9    9.50  0.26   2002     12     0.573  0.569     9.92
     02/07.    378     3.4    9.50  0.00   1481     83     0.775  0.768     5.88
     02/09    390     3.7    9.40  0.31   1522      0     0.770  0.762     %10.10
     02/11    381     1.9    9.36  0.21   1520     16     0.750  0.746     %10.22
     02/14    380     2.5    9.38  0.27   1705      8     0.668  0.664     %10.01
     02/16    338     1.6    9.40  0.26   2300     12     0.441  0.439     %10.17
     02/18    330     1.1    9.41  0.00   1450    122     0.684  0.682     3.95
     02/21    317     1.0    9.40  0.00   1563     92     0.609  0.607     5.66
     02/23    326     2.3    9.42  0.05   1650    248     0.595  0.590     2.15
     02/25    358     4.0    9.41  0.20   1898     88     0.567  0.561     4.99
     02/28    322     4.6    9.40  0.05   1592     94     0.607  0.599     5.20
     03/02    184     1.6    9.36  0.05   1692     58     0.325  0.322     8.48
     03/04    293     2.7    9.41  0.05   1648     62     0.535  0.530     7.78
     03/07    357     5.6    9.45  0.30   1686     66     0.639  0.629     4.76

     MEAN     339     2.5    9.41  0.18   1798     50     0.577  0.573     8.01
     S.DEV 48.84     1.24    .03   .12   253.98  61.01    .12     .11      2.69
     C V % 14.4     50.8     .4    66.4   14.1   121.4   20.8    20.7      33.6
----------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------

   COMPOUND =COMBINED                     THETA C = 1

   PARAMETER =COD                         VOLUME-REACTOR = 2.949

-------------------------------------------------------------------------------
   DATE    SI     SE      F    FW     X      XE     FSI   F(SI-SE)  TC
   1983                                              XV      XV
-------------------------------------------------------------------------------

   01/17   430    12.0   8.64  2.63   450    24    2.800  2.721     1.00
   01/26   540    28.0   9.22  2.95   400     0    4.221  4.002     1.00
   02/04   440    13.0   9.07  2.87   460     6    2.942  2.855     1.00
   02/11   600    46.0   9.22  2.95   540     0    3.474  3.208     1.00
   02/18   560    37.0   9.07  0.79   460   120    3.744  3.497     1.00
   02/25   450    58.0   8.78  2.03   410    56    3.268  2.847     1.00
   03/04   485    27.0   8.93  1.04   330    80    4.450  4.203     1.00

   MEAN    501    31.6   8.99  2.18   436    41    3.557  3.333     1.00
   S.DEV 65.35    16.82   .21   .92  65.02  46.3    .62    .58      0
   C V % 13.2     53.2   2.4   42.3  14.9  113.3  17.4   17.6      0

---------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------

     COMPOUND =COMBINED                   THETA C = 3

     PARAMETER =COD                       VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
     DATE     SI      SE       F     FW       X       XE      FSI    F(SI-SE)  TC
     1983                                                     XV       XV
----------------------------------------------------------------------------------

     01/17    430     12.0    9.22  3.10     930      0      1.375   1.337     1.00
     01/26    540     11.0    9.22  1.03    1150      0      1.397   1.368     3.01
     02/04    440     10.0    9.22  0.95    1510     16      0.867   0.847     2.99
     02/11    600     34.0    9.22  0.94    1460     16      1.222   1.153     3.01
     02/18    560     31.0    9.22  0.96    1870     16      0.891   0.841     3.01
     02/25    450     28.0    9.22  1.01    1260      4      1.062   0.996     2.99
     03/04    485      5.0    9.22  0.96    1700     16      0.849   0.840     2.99

     MEAN     501     18.7    9.22  1.28    1411     10      1.095   1.055     2.71
     S.DEV 66.35      11.82   0      .8   323.69    7.95      .23     .23      .75
     C V % 13.2       63.2    0     62.8    22.9    81.8     21.7    22        27.8

------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------

    COMPOUND =COMBINED                  THETA C = 10

    PARAMETER =COD                      VOLUME-REACTOR = 3.13

---------------------------------------------------------------------------------
    DATE     SI      SE       F     FW      X       XE      FSI   F(SI-SE)  TC
    1983                                                     XV      XV
---------------------------------------------------------------------------------

    01/17   430     0.0    9.38   0.31   2120      0     0.608   0.608    %10.10
    01/28   540    15.0    9.38   0.21   2008     22     0.806   0.784    %10.08
    02/04   440     7.0    9.50   0.26   2002     12     0.667   0.656    9.92
    02/11   600    30.0    9.36   0.21   1520     16     1.180   1.121    %10.22
    02/18   560    33.0    9.41   0.00   1450    122     1.161   1.093    3.95
    02/25   450    26.0    9.41   0.20   1898     88     0.713   0.672    4.99
    03/04   485    12.0    9.41   0.05   1648     62     0.885   0.863    7.78

    MEAN    501    17.6    9.41   0.18   1807     46     0.860   0.828     8.15
    S.DEV 66.35    12.39    .04    .11   264.5   45.72    .23     .2      2.66
    C V % 13.2     70.5     .4     63    14.6    99.3    26.8    25.2      32.7
------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND =COMBINED                    THETA C = 1

     PARAMETER =TOC                        VOLUME-REACTOR = 3.1

-----------------------------------------------------------------------------------
     DATE     SI      SE      F     FW      X       XE      FSI   F(SI-SE)  TC
     1983                                                    XV      XV
-----------------------------------------------------------------------------------

     01/17   110    20.0    8.64  2.63    450      24    0.716  0.586      1.00
     01/24   151    26.0    8.93  2.51    410      28    1.115  0.923      1.00
     01/26   133    13.0    9.22  2.95    400       0    1.040  0.938      1.00
     01/28   150    27.0    9.07  2.72    600      22    0.769  0.631      1.00
     01/31   142    30.0    9.07  2.90    540       4    0.809  0.638      1.00
     02/02   152    43.0    9.22  2.83    530      10    0.897  0.643      1.00
     02/04   169    41.0    9.07  2.87    460       6    1.130  0.856      1.00
     02/07   152    33.5    8.64  2.95    590       0    0.755  0.588      1.00
     02/09   161    37.5    9.07  2.95    310       0    1.597  1.225      1.00
     02/11   169    31.0    9.22  2.95    540       0    0.978  0.799      1.00
     02/14   151    36.5    8.78  2.40    750      64    0.599  0.455      1.00
     02/16   198    41.0    8.64  1.64    590       2    0.983  0.780      1.78
     02/18   154    44.0    9.07  0.79    460     120    1.030  0.735      1.00
     02/21   135    34.0    8.64  1.98    590      86    0.670  0.502      1.00
     02/23   120    31.0    8.64  2.48    370      28    0.950  0.705      1.00
     02/25   161    41.0    8.78  2.03    410      56    1.169  0.871      1.00
     02/28   238    35.0    8.78  0.83    390     104    1.817  1.550      1.00
     03/02   160    30.0    8.78  1.79    290      48    1.643  1.335      1.00
     03/04   130    27.0    8.93  1.04    330      80    1.193  0.945      1.00
     03/07   137    38.0    8.93  1.67    410      72    1.012  0.731      1.00

     MEAN    154    33.0    8.91  2.25    471      38    1.044  0.822      1.04
     S.DEV 27.64    7.91     .21   .73  117.46   38.46    .32    .27       .17
     C V % 17.9     24       2.3  32.7   24.9   102      31.1   33.9       16.7

-------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------

   COMPOUND =COMBINED                      THETA C = 3

   PARAMETER =TOC                          VOLUME-REACTOR = 3.1

---------------------------------------------------------------------------
   DATE     SI      SE       F     FW      X       XE      FSI    F(SI-SE)  TC
   1983                                                     XV       XV
---------------------------------------------------------------------------

   01/17    110    19.0    9.22   1.03    930      0     0.352   0.291     3.01
   01/24    151    22.0    9.22   0.93    990     12     0.454   0.388     3.01
   01/26    133    22.0    9.22   1.03   1150      0     0.344   0.287     3.01
   01/28    150    27.0    9.22   0.98   1180      8     0.378   0.310     2.99
   01/31    142    39.0    9.22   0.99   1560      8     0.271   0.196     3.00
   02/02    152    45.0    9.22   0.99   1390      8     0.325   0.229     2.99
   02/04    169    41.0    9.22   0.95   1510     16     0.333   0.252     2.99
   02/07    152    34.0    9.22   1.03   1860      0     0.243   0.189     3.01
   02/09    161    23.0    9.22   0.99   1650      8     0.290   0.249     3.01
   02/11    169    33.0    9.22   0.94   1460     16     0.344   0.277     3.01
   02/14    151    27.0    9.22   0.99   1640      8     0.274   0.225     3.01
   02/16    198    33.0    9.22   1.01   1450      4     0.406   0.338     3.00
   02/18    154    37.0    9.22   0.96   1870     16     0.245   0.186     3.01
   02/21    135    71.0    9.22   1.01   1350      4     0.297   0.141     3.00
   02/23    120    26.0    9.22   0.98   1200      8     0.297   0.233     3.00
   02/25    161    40.0    9.22   1.01   1260      4     0.380   0.286     2.99
   02/28    238    26.0    9.22   1.01   1270      4     0.557   0.496     2.99
   03/02    160    30.0    9.22   1.01   1410      4     0.337   0.274     3.00
   03/04    130    34.0    9.22   0.96   1700     16     0.227   0.168     2.99
   03/07    137    39.0    9.22   1.01   1450      4     0.281   0.201     3.00

   MEAN     154    33.4    9.22   0.99   1414      7     0.332   0.261     3.00
   S.DEV 27.64     11.48   0       .02   257.93  5.39     .07     .08      0
   C V % 17.9      34.3    0       3     18.2   72.8     23.6    31.4      .2

------------------------------------------------------------------------
```

```
-----------------------------------------------------------------------------

    COMPOUND =COMBINED                   THETA C = 10

    PARAMETER =TOC                       VOLUME-REACTOR = 3.13

---------------------------------------------------------------------------------
    DATE     SI      SE       F     FW      X       XE      FSI    F(SI-SE)  TC
    1983                                                     XV       XV
---------------------------------------------------------------------------------

    01/17   110     13.0    9.38  0.31   2120      0     0.155   0.137     %10.10
    01/24   151     23.0    9.38  0.25   1990     14     0.227   0.193     9.96
    01/26   133     17.0    9.38  0.31   2000      0     0.199   0.174     %10.10
    01/28   150     23.0    9.38  0.21   2008     22     0.224   0.190     %10.08
    01/31   142     33.0    9.40  0.31   2018      0     0.211   0.162     %10.10
    02/02   152     40.0    9.40  0.26   2112      8     0.216   0.159     %10.62
    02/04   169     42.0    9.50  0.26   2002     12     0.256   0.193     9.92
    02/07   152     37.0    9.50  0.00   1481     83     0.312   0.236     5.88
    02/09   161     23.0    9.40  0.31   1522      0     0.318   0.272     %10.10
    02/11   169     26.0    9.36  0.21   1520     16     0.332   0.281     %10.22
    02/14   151     30.0    9.38  0.27   1705      8     0.265   0.213     %10.01
    02/16   198     33.0    9.40  0.26   2300     12     0.259   0.215     %10.17
    02/18   154     36.0    9.41  0.00   1450    122     0.319   0.245     3.95
    02/21   135     21.0    9.40  0.00   1563     92     0.259   0.219     5.66
    02/23   120     31.0    9.42  0.05   1650    248     0.219   0.162     2.15
    02/25   161     39.0    9.41  0.20   1898     88     0.255   0.193     4.99
    02/28   238     30.0    9.40  0.05   1592     94     0.449   0.392     5.20
    03/02   160     25.0    9.36  0.05   1692     58     0.283   0.239     8.48
    03/04   130     23.0    9.41  0.05   1648     62     0.237   0.195     7.78
    03/07   137     42.0    9.45  0.30   1686     66     0.245   0.170     4.76

    MEAN     154    29.4    9.41  0.18   1798     50     0.262   0.212     8.01
    S.DEV 27.64     8.39     .03   .12  253.98  61.01     .06     .05      2.69
    C V % 17.9      28.6     .4    66.4  14.1   121.4    23.9    26.9      33.6

-----------------------------------------------------------------------------
```

COMPOUND = FLUORANTHENE THETA C = 1

PARAMETER = BOD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	270	6.2	9.22	2.53	580	40	1.354	1.323	1.06
04/06	278	2.5	9.50	2.76	467	20	1.784	1.768	1.04
04/08	281	13.4	9.50	3.17	424	0	1.986	1.891	1.00
04/11	271	6.8	9.22	3.08	390	4	2.021	1.970	1.01
04/13	286	3.2	9.50	3.17	410	0	2.090	2.067	1.00
04/15	259	4.6	9.50	3.17	260	0	2.985	2.932	1.00
04/18	237	4.0	9.52	3.17	362	0	1.966	1.933	1.00
04/20	267	6.0	9.50	1.77	490	38	1.633	1.596	1.34
04/22	280	8.9	9.51	3.17	404	0	2.079	2.013	1.00
04/25	260	4.1	9.50	2.91	363	10	2.147	2.113	1.03
04/27	273	4.9	9.22	2.08	220	24	3.609	3.544	1.11
04/29	307	4.9	9.55	3.17	365	0	2.534	2.493	1.00
05/02	300	4.2	9.50	3.17	202	0	4.451	4.388	1.00
05/04	282	4.2	9.65	3.17	300	0	2.862	2.819	1.00
05/06	276	3.4	9.22	2.80	260	10	3.088	3.049	1.04
05/09	269	4.0	9.50	3.17	298	0	2.705	2.665	1.00
05/11	260	11.6	9.50	3.17	322	0	2.420	2.312	1.00
05/13	279	8.3	9.46	3.17	410	0	2.031	1.970	1.00
05/16	259	4.8	9.50	2.60	260	42	2.985	2.930	0.85
05/18	289	5.5	9.45	3.17	300	0	2.872	2.817	1.00
05/20	281	4.4	9.50	3.17	260	0	3.239	3.188	1.00
05/23	210	1.6	9.50	3.17	280	0	2.248	2.231	1.00
05/25	180	5.8	9.50	3.17	295	0	1.829	1.770	1.00
MEAN	268	5.5	9.46	2.96	344	8	2.475	2.425	1.02
S.DEV	27.52	2.76	.11	.38	93.13	14.24	.71	.71	.08
C V %	10.2	50	1.2	12.9	27	174.2	28.9	29.3	7.9

COMPOUND = FLUORANTHENE

THETA C = 3

PARAMETER = BOD

VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	FSi / XV	F(Si-Se) / XV	TC
04/04	270	2.2	9.07	1.07	820	16	0.942	0.934	2.59
04/06	278	1.3	9.40	1.06	845	0	0.976	0.971	2.99
04/08	281	1.8	9.36	1.06	806	0	1.029	1.023	2.99
04/11	271	3.1	9.36	1.00	677	0	1.182	1.168	3.17
04/13	286	1.2	9.50	0.62	856	40	1.001	0.997	3.08
04/15	259	1.6	9.36	1.06	933	0	0.820	0.815	2.99
04/18	237	3.6	9.50	1.00	986	0	0.720	0.709	3.17
04/20	267	2.9	9.50	0.75	1000	20	0.800	0.791	3.43
04/22	280	3.1	9.48	1.06	868	0	0.965	0.954	2.99
04/25	259	2.2	9.50	1.06	1180	0	0.658	0.652	2.93
04/27	273	1.9	9.50	0.79	907	26	0.902	0.896	3.05
04/29	307	2.4	9.50	1.06	1280	0	0.719	0.713	2.99
05/02	300	0.6	9.36	1.06	867	0	1.022	1.020	2.99
05/04	282	1.9	9.22	0.91	986	16	0.832	0.826	3.03
05/06	276	2.2	9.50	0.94	1160	14	0.713	0.707	3.04
05/09	269	2.6	9.50	1.06	1082	0	0.745	0.738	2.99
05/11	260	2.9	9.55	1.06	1004	0	0.780	0.771	2.99
05/13	279	3.6	9.50	1.06	970	0	0.862	0.851	2.99
05/16	259	4.5	9.50	1.05	836	0	0.928	0.912	3.02
05/18	289	5.1	9.50	1.05	893	0	0.970	0.953	3.02
05/20	281	5.6	9.22	1.06	830	0	0.985	0.965	2.99
05/23	210	0.8	9.40	1.06	860	0	0.724	0.721	2.99
05/25	180	2.8	9.50	1.06	890	0	0.606	0.597	2.99
MEAN	268	2.6	9.43	1.00	936	6	0.864	0.856	3.02
S.DEV	27.53	1.27	.11	.12	137.76	10.92	.14	.14	.13
C V %	10.2	48.8	1.2	12.1	14.7	190.3	16.6	16.6	4.5

COMPOUND = FLUORANTHENE THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	270	1.7	9.50	0.07	2032	52	0.398	0.396	10.19
04/06	278	1.0	9.36	0.10	2005	46	0.409	0.408	10.15
04/08	281	0.4	9.40	0.30	2222	60	0.375	0.374	5.81
04/11	271	2.7	9.50	0.05	1804	61	0.450	0.446	8.58
04/13	286	1.3	9.50	0.11	2350	52	0.365	0.363	9.98
04/15	259	1.2	9.50	0.32	2103	0	0.369	0.367	9.91
04/18	237	1.4	9.40	0.32	1800	0	0.390	0.388	9.91
04/20	267	1.5	9.48	0.05	1910	130	0.418	0.416	4.58
04/22	280	1.8	9.46	0.32	1887	0	0.443	0.440	9.91
04/25	259	1.8	9.50	0.32	1740	0	0.446	0.443	9.91
04/27	273	1.4	9.50	0.24	1880	25	0.435	0.433	8.73
04/29	307	0.9	9.50	0.30	2000	8	0.460	0.459	9.41
05/02	300	1.4	9.50	0.32	1800	0	0.499	0.497	9.91
05/04	282	0.9	9.50	0.32	1886	0	0.448	0.447	9.91
05/06	276	1.1	9.50	0.30	1730	34	0.478	0.476	6.59
05/09	269	1.5	9.40	0.20	1610	20	0.495	0.493	10.09
05/11	260	0.9	9.50	0.32	1956	0	0.398	0.397	9.91
05/13	279	2.0	9.52	0.32	2058	0	0.407	0.404	9.91
05/16	259	1.8	9.50	0.32	1674	0	0.464	0.460	9.91
05/18	289	2.0	9.50	0.31	1960	0	0.442	0.439	10.23
05/20	281	4.3	9.22	0.31	1890	0	0.432	0.426	10.23
05/23	210	1.8	9.50	0.31	2080	0	0.303	0.300	10.23
05/25	180	2.2	9.46	0.31	2020	0	0.266	0.263	10.23
MEAN	268	1.6	9.47	0.25	1930	21	0.417	0.415	9.31
S.DEV	27.53	.77	.06	.1	173.63	32.77	.05	.05	1.53
C V %	10.2	48.2	.7	39.6	8.9	154.4	13.5	13.5	16.5

COMPOUND = FLUORANTHENE THETA C = 1

PARAMETER = COD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	500	78.5	9.50	3.17	424	0	3.534	2.979	1.00
04/13	560	21.0	9.50	3.17	410	0	4.093	3.940	1.00
04/22	418	20.0	9.50	3.17	404	0	3.101	2.952	1.00
04/29	440	44.0	9.55	3.17	202	0	6.562	5.906	1.00
05/06	360	10.0	9.22	2.80	260	10	4.027	3.915	1.04
05/11	400	20.0	9.50	3.17	298	0	4.023	3.821	1.00
05/18	410	12.0	9.45	3.17	300	0	4.074	3.955	1.00
05/25	320	10.0	9.50	3.17	295	0	3.251	3.149	1.00
MEAN	426	26.9	9.47	3.12	324	1	4.083	3.827	1.01
S.DEV	75.79	23.53	.1	.13	80.06	3.53	1.07	.94	.01
C V %	17.7	87.3	1	4.1	24.7	282.8	26.3	24.7	1.4

COMPOUND = FLUORANTHENE THETA C = 3

PARAMETER = COD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	500	11.0	9.36	1.06	806	0	1.832	1.791	2.99
04/13	560	27.0	9.50	0.62	856	40	1.961	1.866	3.08
04/22	418	10.0	9.48	1.06	868	0	1.440	1.406	2.99
04/29	440	16.0	9.50	1.06	1280	0	1.030	0.993	2.99
05/06	360	0.0	9.50	0.94	1160	14	0.930	0.930	3.04
05/11	400	6.0	9.55	1.06	1004	0	1.200	1.182	2.99
05/18	410	10.0	9.50	1.05	893	0	1.376	1.342	3.02
05/25	320	14.0	9.50	1.06	890	0	1.078	1.030	2.99
MEAN	426	11.8	9.49	0.99	970	7	1.356	1.318	3.01
S.DEV	75.79	7.86	.05	.15	167.32	14.3	.37	.35	.03
C V %	17.7	66.9	.5	15.8	17.2	211.8	27.7	27	1

COMPOUND = FLUORANTHENE THETA C = 10

PARAMETER = COD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	500	9.0	9.40	0.30	2222	60	0.667	0.655	5.81
04/13	560	7.0	9.50	0.11	2350	52	0.714	0.705	9.98
04/22	418	8.0	9.46	0.32	1887	0	0.661	0.648	9.91
04/29	440	10.0	9.50	0.30	2000	8	0.659	0.644	9.41
05/06	360	0.0	9.50	0.30	1730	34	0.624	0.624	6.59
05/11	400	0.0	9.50	0.32	1956	0	0.613	0.613	9.91
05/18	410	10.0	9.50	0.31	1960	0	0.627	0.612	10.23
05/25	320	10.0	9.46	6.31	2020	0	0.473	0.458	0.50
MEAN	426	6.8	9.48	1.03	2016	19	0.630	0.620	7.79
S.DEV	75.79	4.3	.03	2.13	192.51	25.52	.07	.07	3.39
C V %	17.7	63.7	.3	206.3	9.5	132.5	11.2	11.6	43.5

COMPOUND = FLUORANTHENE

THETA C = 1

PARAMETER = TOC

VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	178	29.0	9.22	2.53	580	40	0.893	0.747	1.06
04/06	179	30.5	9.50	2.76	467	20	1.149	0.953	1.04
04/08	198	45.5	9.50	3.17	424	0	1.399	1.078	1.00
04/11	207	27.5	9.22	3.08	390	4	1.544	1.339	1.01
04/13	234	26.5	9.50	3.17	410	0	1.710	1.517	1.00
04/15	224	29.0	9.50	3.17	260	0	2.582	2.248	1.00
04/18	194	37.5	9.52	3.17	362	0	1.609	1.298	1.00
04/20	204	32.0	9.50	1.77	490	38	1.248	1.052	1.34
04/22	223	36.5	9.50	3.17	404	0	1.654	1.383	1.00
04/25	174	25.5	9.50	2.91	363	10	1.437	1.226	1.03
04/27	176	31.0	9.22	2.08	220	24	2.327	1.917	1.11
04/29	210	26.5	9.55	3.17	365	0	1.733	1.515	1.00
05/02	162	26.0	9.50	3.17	202	0	2.403	2.018	1.00
05/04	171	24.0	9.65	3.17	300	0	1.735	1.492	1.00
05/06	145	24.0	9.22	2.80	260	10	1.622	1.354	1.04
05/09	200	26.5	9.50	3.17	298	0	2.011	1.745	1.00
05/11	124	50.5	9.50	3.17	322	0	1.154	0.684	1.00
05/13	204	22.5	9.46	3.17	410	0	1.481	1.317	1.00
05/16	187	24.0	9.50	2.60	260	42	2.155	1.879	0.85
05/18	179	27.0	9.45	3.17	300	0	1.779	1.510	1.00
05/20	180	23.5	9.50	3.17	260	0	2.075	1.804	1.00
05/23	199	23.0	9.50	3.17	280	0	2.130	1.884	1.00
05/25	114	24.0	9.50	3.17	295	0	1.158	0.914	1.00
MEAN	185	29.2	9.46	2.96	344	8	1.695	1.423	1.02
S.DEV	29.6	7.17	.11	.38	93.13	14.24	.44	.41	.08
C V %	15.9	24.5	1.2	12.9	27	174.2	26	29	7.9

COMPOUND = FLUORANTHENE THETA C = 3

PARAMETER = TOC VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	178	31.5	9.07	1.07	820	16	0.621	0.511	2.59
04/06	179	23.0	9.40	1.06	845	0	0.628	0.547	2.99
04/08	198	22.0	9.36	1.06	806	0	0.725	0.645	2.99
04/11	207	21.5	9.36	1.00	677	0	0.903	0.809	3.17
04/13	234	31.0	9.50	0.62	856	40	0.819	0.711	3.08
04/15	224	22.5	8.50	1.06	933	0	0.644	0.579	2.99
04/18	194	26.5	9.50	1.00	986	0	0.590	0.509	3.17
04/20	204	33.0	9.50	0.75	1000	20	0.611	0.512	3.43
04/22	223	27.5	9.48	1.06	868	0	0.768	0.674	2.99
04/25	174	27.0	9.50	1.06	1180	0	0.442	0.373	2.99
04/27	176	31.0	9.50	0.79	997	26	0.582	0.479	3.05
04/29	210	25.5	9.50	1.06	1280	0	0.492	0.432	2.99
05/02	162	16.0	9.36	1.06	867	0	0.552	0.497	2.99
05/04	172	16.0	9.22	0.91	986	16	0.507	0.460	3.03
05/06	145	16.0	9.50	0.94	1160	14	0.375	0.333	3.04
05/09	200	22.0	9.50	1.06	1082	0	0.554	0.493	2.99
05/11	124	57.5	9.55	1.06	1004	0	0.372	0.200	2.99
05/13	204	24.0	9.50	1.06	970	0	0.630	0.556	2.99
05/16	187	26.5	9.50	1.05	836	0	0.670	0.575	3.02
05/18	179	24.5	9.50	1.05	893	0	0.601	0.518	3.02
05/20	180	25.0	9.22	1.06	830	0	0.631	0.543	2.99
05/23	199	25.0	9.40	1.06	860	0	0.686	0.600	2.99
05/25	144	18.5	9.50	1.06	890	0	0.485	0.423	2.99
MEAN	187	25.8	9.39	1.00	936	6	0.604	0.521	3.02
S.DEV	26.83	8.42	.22	.12	137.76	10.92	.12	.12	.13
C V %	14.3	32.6	2.4	12.1	14.7	190.3	21.3	24.4	4.5

COMPOUND = FLUORANTHENE THETA C = 10

PARAMETER = TOC VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	178	20.0	9.50	0.07	2033	52	0.262	0.233	10.19
04/06	179	15.0	9.36	0.10	2005	46	0.264	0.242	10.15
04/08	198	29.0	9.40	0.30	2222	60	0.264	0.226	5.81
04/11	207	21.5	9.50	0.05	1804	61	0.344	0.308	8.58
04/13	234	16.0	9.50	0.11	2350	52	0.298	0.278	9.98
04/15	224	19.5	9.50	0.32	2103	0	0.319	0.291	9.91
04/18	194	23.5	9.40	0.32	1800	0	0.320	0.281	9.91
04/20	204	21.5	9.48	0.05	1910	130	0.319	0.286	4.58
04/22	223	22.0	9.46	0.32	1887	0	0.353	0.318	9.91
04/25	174	25.5	9.50	0.32	1740	0	0.300	0.256	9.91
04/27	176	18.5	9.50	0.24	1880	25	0.281	0.251	8.73
04/29	210	19.5	9.50	0.30	2000	8	0.315	0.285	9.41
05/02	162	13.0	9.50	0.32	1000	0	0.485	0.447	9.91
05/04	171	14.5	9.50	0.32	1886	0	0.272	0.249	9.91
05/06	145	15.0	9.50	0.30	1730	34	0.251	0.225	6.59
05/09	200	18.5	9.40	0.20	1610	20	0.368	0.334	10.09
05/11	124	18.0	9.50	0.32	1956	0	0.190	0.162	9.91
05/13	204	16.5	9.52	0.32	2058	0	0.298	0.274	9.91
05/16	187	1.8	9.50	0.32	1674	0	0.335	0.332	9.91
05/18	179	2.0	9.50	0.31	1960	0	0.274	0.271	10.23
05/20	180	4.3	9.22	0.31	1890	0	0.277	0.270	10.23
05/23	199	1.8	9.50	0.31	2080	0	0.287	0.284	10.23
05/25	114	2.2	9.46	0.31	2020	0	0.168	0.165	10.23
MEAN	185	15.6	9.47	0.25	1896	21	0.298	0.272	9.31
S.DEV	29.62	7.99	.06	.1	259.72	32.77	.06	.05	1.53
C V %	15.9	51.1	.7	39.6	13.7	154.4	20.8	21.2	16.5

COMPOUND = 2-CHLORONAPHTHALENE   THETA C = 1

PARAMETER = BOD   VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	255	2.2	8.93	3.10	670	0	1.096	1.087	1.00
04/06	268	1.2	8.93	3.10	640	0	1.206	1.201	1.00
04/08	244	1.1	9.50	3.10	500	0	1.495	1.489	1.00
04/11	268	5.0	8.64	2.88	420	16	1.778	1.745	1.00
04/13	259	1.6	10.00	3.10	570	0	1.466	1.457	1.00
04/15	244	2.6	9.50	2.90	530	16	1.411	1.396	1.00
04/18	248	6.5	9.79	2.84	530	20	1.478	1.439	1.00
04/20	244	3.2	9.50	3.10	580	0	1.289	1.272	1.00
04/22	242	3.6	9.50	3.10	390	0	1.902	1.873	1.00
04/25	274	4.5	9.22	3.10	390	0	2.090	2.055	1.00
04/27	280	5.7	9.50	2.73	580	32	1.479	1.449	1.00
04/29	250	3.2	9.22	2.85	610	24	1.219	1.203	1.00
05/02	276	5.2	9.22	2.63	620	44	1.324	1.299	1.00
05/04	241	2.4	9.50	3.10	510	0	1.448	1.434	1.00
05/06	264	3.7	9.22	3.10	480	0	1.636	1.613	1.00
05/09	276	4.6	9.50	1.87	520	84	1.627	1.599	1.00
05/11	254	3.7	9.22	2.80	510	24	1.481	1.460	1.00
05/13	246	4.8	9.50	3.10	490	0	1.539	1.508	1.00
05/16	248	6.7	9.50	3.10	350	0	2.171	2.113	1.00
05/18	259	12.2	9.50	3.10	440	0	1.804	1.719	1.00
05/20	297	9.6	9.50	3.00	250	4	3.641	3.523	1.00
05/23	204	4.9	9.50	3.10	560	0	1.116	1.090	1.00
05/25	227	5.2	9.22	3.10	750	0	0.900	0.880	1.00
MEAN	255	4.5	9.37	2.95	517	11	1.591	1.561	1.00
S.DEV	19.54	2.58	.28	.27	111.65	20.29	.54	.52	0
C V %	7.6	57.4	3	9.3	21.5	176.8	34.1	33.3	0

COMPOUND = 2-CHLORONAPHTHALENE   THETA C = 3

PARAMETER = BOD   VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	255	2.1	8.93	1.01	990	0	0.742	0.736	3.07
04/06	268	0.9	8.93	1.01	990	0	0.780	0.777	3.07
04/08	244	1.0	9.22	1.00	880	0	0.825	0.821	3.10
04/11	268	3.5	8.64	0.97	950	8	0.786	0.776	3.00
04/13	259	1.9	9.22	1.00	890	0	0.866	0.859	3.10
04/15	244	1.5	9.22	0.90	1010	16	0.719	0.714	3.00
04/18	248	2.9	9.36	0.85	950	20	0.788	0.779	3.01
04/20	244	0.9	9.22	0.63	940	44	0.772	0.769	3.00
04/22	242	1.7	9.22	1.03	1110	0	0.648	0.644	3.01
04/25	274	1.8	8.93	1.01	1250	4	0.631	0.627	2.99
04/27	280	1.9	9.22	1.03	1080	0	0.771	0.766	3.01
04/29	250	1.5	9.22	0.86	1170	24	0.636	0.632	3.01
05/02	276	1.9	9.22	0.88	1070	20	0.767	0.762	2.99
05/06	264	1.7	9.22	1.01	1030	4	0.762	0.757	2.98
05/09	276	2.0	9.22	0.98	1250	8	0.657	0.652	3.00
05/11	254	0.9	9.22	0.80	1170	32	0.646	0.643	3.01
05/13	246	0.2	9.22	1.03	1320	0	0.554	0.554	3.01
05/16	248	2.4	9.22	1.01	1030	4	0.716	0.709	2.98
05/18	259	3.1	9.22	1.03	950	0	0.811	0.801	3.01
05/20	297	2.7	9.22	0.82	790	20	1.118	1.108	3.00
05/23	204	0.0	9.22	1.03	940	0	0.645	0.645	3.01
05/25	227	2.8	8.93	1.03	1170	0	0.559	0.552	3.01
MEAN	256	1.8	9.15	0.95	1042	9	0.736	0.731	3.02
S.DEV	19.75	.9	.16	.1	135.5	12.49	.12	.11	.03
C V %	7.7	50.6	1.8	11	13	134.7	16.3	16.2	1.1

COMPOUND = 2-CHLORONAPHTHALENE   THETA C = 10

PARAMETER = BOD   VOLUME-REACTOR = 3.3

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	255	2.3	9.79	0.33	2610	0	0.290	0.287	10.00
04/06	268	1.4	9.79	0.33	2540	0	0.313	0.311	10.00
04/08	244	0.2	9.79	0.29	2560	12	0.283	0.283	9.86
04/11	268	3.9	8.93	0.33	2250	0	0.322	0.318	10.00
04/13	259	1.1	9.79	0.33	2100	0	0.366	0.364	10.00
04/15	244	1.5	9.79	0.22	2040	24	0.355	0.353	9.92
04/18	248	1.6	10.37	0.31	2100	4	0.371	0.369	10.03
04/20	244	0.5	9.79	0.33	2390	0	0.303	0.302	10.00
04/22	242	1.2	9.79	0.27	2380	16	0.302	0.300	9.88
04/25	274	1.8	8.93	0.00	1900	112	0.390	0.388	6.27
04/27	280	1.0	9.79	0.11	1940	44	0.428	0.427	10.01
04/29	250	1.4	9.50	0.25	2280	16	0.316	0.314	10.48
05/02	276	0.9	9.50	0.33	2070	0	0.384	0.383	10.00
05/04	241	0.9	9.79	0.33	2080	0	0.344	0.342	10.00
05/06	264	0.9	9.50	0.33	2130	0	0.357	0.356	10.00
05/09	276	0.8	9.79	0.31	1980	4	0.414	0.412	10.03
05/16	248	0.6	9.79	0.33	1090	0	0.675	0.673	10.00
05/18	259	1.9	9.79	0.33	1320	56	0.582	0.578	4.51
05/20	297	1.7	10.01	0.33	2040	0	0.442	0.439	10.00
05/23	204	1.0	9.79	0.00	1620	60	0.374	0.372	9.10
05/25	227	1.0	9.50	0.00	900	64	0.726	0.723	4.88
MEAN	256	1.3	9.69	0.26	2015	20	0.397	0.395	9.28
S.DEV	20.38	.77	.31	.11	453.87	30.4	.12	.12	1.73
C V %	7.9	59	3.2	46.6	22.5	154.9	30.5	30.5	18.7

COMPOUND = 2-CHLORONAPHTHALENE   THETA C = 1

PARAMETER = COD   VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	FSi / XV	F(Si-Se) / XV	TC
04/08	485	5.0	9.50	3.10	500	0	2.973	2.942	1.00
04/13	500	16.0	10.00	3.10	570	0	2.830	2.739	1.00
04/22	430	22.0	9.50	3.10	390	0	3.379	3.206	1.00
04/29	450	30.0	9.22	2.85	610	24	2.194	2.048	1.00
05/06	345	14.0	9.22	3.10	480	0	2.138	2.051	1.00
05/13	350	26.0	9.50	3.10	490	0	2.189	2.026	1.00
05/20	445	10.0	9.50	3.00	250	4	5.455	5.332	1.00
05/25	390	21.0	9.22	3.10	750	0	1.547	1.463	1.00
MEAN	424	18.0	9.46	3.06	505	4	2.838	2.726	1.00
S.DEV	57.96	8.33	.25	.09	148.51	8.4	1.2	1.19	0
C V %	13.6	46.2	2.7	2.9	29.4	240	42.4	43.9	0

COMPOUND = 2-CHLORONAPHTHALENE THETA C = 3

PARAMETER = COD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	485	11.0	9.22	1.00	880	0	1.639	1.602	3.10
04/13	500	12.0	9.22	1.00	890	0	1.671	1.631	3.10
04/22	430	9.0	9.22	1.03	1110	0	1.152	1.128	3.01
04/29	450	18.0	9.22	0.86	1170	24	1.144	1.098	3.01
05/06	345	10.0	9.22	1.01	1030	4	0.996	0.967	2.98
05/13	350	10.0	9.22	1.03	1320	0	0.789	0.766	3.01
05/20	445	4.0	9.22	0.82	790	20	1.675	1.660	3.00
05/25	390	28.0	8.93	1.03	1170	0	0.960	0.891	3.01
MEAN	424	12.8	9.18	0.97	1045	6	1.253	1.218	3.03
S.DEV	57.96	7.26	.1	.08	180.31	10.02	.35	.36	.04
C V %	13.6	56.9	1.1	8.5	17.2	167.1	28.4	29.5	1.5

COMPOUND = 2-CHLORONAPHTHALENE   THETA C = 10

PARAMETER = COD   VOLUME-REACTOR = 3.3

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	485	9.0	9.79	0.29	2560	12	0.562	0.552	9.86
04/13	500	11.0	9.79	0.33	2100	0	0.706	0.691	10.00
04/22	430	4.0	9.79	0.27	2380	16	0.536	0.531	9.88
04/29	450	10.0	9.50	0.25	2280	16	0.568	0.556	10.48
05/06	345	10.0	9.50	0.33	2130	0	0.466	0.453	10.00
05/20	445	0.0	10.01	0.33	2040	0	0.662	0.662	10.00
05/25	390	19.0	9.50	0.00	900	64	1.247	1.187	4.88
MEAN	435	9.0	9.70	0.26	2056	15	0.678	0.661	9.30
S.DEV	53.54	5.94	.2	.11	540.55	22.67	.26	.24	1.95
C V %	12.3	66	2	45.8	26.2	146.9	38.8	37	21

COMPOUND = 2-CHLORONAPHTHALENE THETA C = 1

PARAMETER = TOC VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	210	23.0	8.93	3.10	670	0	0.903	0.804	1.00
04/06	221	22.0	8.93	3.10	640	0	0.995	0.896	1.00
04/08	185	23.0	9.50	3.10	500	0	1.134	0.993	1.00
04/11	227	21.0	8.64	2.88	420	16	1.506	1.367	1.00
04/13	227	21.0	10.00	3.10	570	0	1.285	1.166	1.00
04/15	225	19.0	9.50	2.90	530	16	1.301	1.191	1.00
04/18	205	15.0	9.79	2.84	530	20	1.222	1.132	1.00
04/20	213	15.0	9.50	3.10	580	0	1.125	1.046	1.00
04/22	210	13.0	9.50	3.10	390	0	1.650	1.548	1.00
04/25	206	25.0	9.22	2.78	400	20	1.532	1.346	1.00
04/27	186	26.0	9.50	2.73	580	32	0.983	0.845	1.00
04/29	175	30.0	9.22	2.85	610	24	0.853	0.707	1.00
05/02	188	26.0	9.22	2.63	620	44	0.902	0.777	1.00
05/04	186	17.0	9.50	3.10	510	0	1.118	1.015	1.00
05/06	193	21.0	9.22	3.10	480	0	1.196	1.066	1.00
05/09	185	23.0	9.50	1.87	520	84	1.090	0.955	1.00
05/11	186	21.0	9.22	2.80	510	24	1.085	0.962	1.00
05/13	341	31.0	9.50	3.10	490	0	2.133	1.939	1.00
05/16	140	19.0	9.50	3.10	350	9	1.226	1.059	1.00
05/18	166	21.0	9.50	3.10	440	0	1.156	1.010	1.00
05/20	182	26.0	9.50	3.00	250	4	2.231	1.912	1.00
05/23	213	24.0	9.50	3.10	560	0	1.166	1.034	1.00
05/25	164	22.0	9.22	3.10	750	0	0.650	0.563	1.00
MEAN	201	21.9	9.37	2.94	517	12	1.237	1.101	1.00
S.DEV	37.65	4.45	.28	.27	111.15	20.21	.37	.33	0
C V %	18.6	20.3	3	9.4	21.4	163.7	30.1	30.7	0

COMPOUND = 2-CHLORONAPHTHALENE THETA C = 3

PARAMETER = TOC VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/06	221	21.0	8.93	1.01	990	0	0.643	0.582	3.07
04/08	185	18.0	9.22	1.00	880	0	0.625	0.564	3.10
04/11	227	16.0	8.64	0.97	950	8	0.666	0.619	3.00
04/13	227	16.0	9.22	1.00	890	0	0.759	0.705	3.10
04/15	225	17.0	9.22	0.90	1010	16	0.663	0.613	3.00
04/18	205	17.0	9.36	0.85	950	20	0.652	0.598	3.01
04/20	213	16.0	9.22	0.63	940	44	0.674	0.623	3.00
04/22	210	14.0	9.22	1.03	1110	0	0.563	0.525	3.01
04/25	206	20.0	8.93	1.01	1250	4	0.475	0.429	2.99
04/27	186	16.0	9.22	1.03	1080	0	0.512	0.468	3.01
04/29	175	18.0	9.22	0.86	1170	24	0.445	0.399	3.01
05/02	188	14.0	9.22	0.88	1070	20	0.523	0.484	2.99
05/06	193	12.0	9.22	1.01	1030	4	0.557	0.523	2.98
05/09	185	17.0	9.22	0.98	1250	8	0.440	0.400	3.00
05/11	186	17.0	9.22	0.80	1170	32	0.473	0.430	3.01
05/13	341	17.0	9.22	1.03	1320	0	0.768	0.730	3.01
05/16	140	14.0	9.22	1.01	1030	4	0.404	0.364	2.98
05/18	166	11.0	9.22	1.03	950	0	0.520	0.485	3.01
05/20	182	17.0	9.22	0.82	790	20	0.685	0.621	3.00
05/23	213	19.0	9.22	1.03	940	0	0.674	0.614	3.01
05/25	164	19.0	8.93	1.03	1170	0	0.404	0.357	3.01
MEAN	202	16.5	9.16	0.95	1045	10	0.577	0.530	3.01
S.DEV	39.28	2.46	.16	.1	138.33	12.62	.11	.1	.03
C V %	19.4	14.9	1.7	11.2	13.2	129.9	19.5	20.5	1.1

COMPOUND = 2-CHLORONAPHTHALENE THETA C = 10

PARAMETER = TOC VOLUME-REACTOR = 3.3

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	210	32.0	9.79	0.33	2610	0	0.239	0.202	10.00
04/06	221	27.0	9.79	0.33	2540	0	0.258	0.227	10.00
04/08	185	18.0	9.79	0.29	2560	12	0.214	0.194	9.86
04/11	227	18.0	8.93	0.33	2250	0	0.273	0.251	10.00
04/13	227	27.0	9.79	0.33	2100	0	0.321	0.283	10.00
04/15	225	14.0	9.79	0.22	2040	24	0.327	0.307	9.92
04/18	205	23.0	10.37	0.31	2100	4	0.307	0.272	10.03
04/20	213	27.0	9.79	0.33	2390	0	0.264	0.231	10.00
04/22	210	30.0	9.79	0.27	2380	16	0.262	0.224	9.88
04/25	206	22.0	8.93	0.00	1900	112	0.293	0.262	6.27
04/27	186	14.0	9.79	0.11	1940	44	0.284	0.263	10.01
04/29	175	15.0	9.50	0.25	2280	16	0.221	0.202	10.48
05/02	188	8.0	9.50	0.33	2070	0	0.261	0.250	10.00
05/04	186	7.0	9.79	0.33	2080	0	0.265	0.255	10.00
05/06	193	8.0	9.50	0.33	2130	0	0.261	0.250	10.00
05/09	185	12.0	9.79	0.31	1980	4	0.277	0.259	10.03
05/16	140	30.0	9.79	0.33	1090	0	0.381	0.299	10.00
05/18	166	12.0	9.79	0.33	1320	56	0.373	0.346	4.51
05/20	182	10.0	10.01	0.33	2040	0	0.271	0.256	10.00
05/23	213	18.0	9.79	0.00	1620	60	0.390	0.357	9.10
05/25	164	22.0	9.50	0.00	900	64	0.525	0.454	4.88
MEAN	196	18.8	9.69	0.26	2015	20	0.238	0.269	9.28
S.DEV	23.18	7.96	.31	.11	453.87	30.4	.07	.05	1.73
C V %	11.8	42.4	3.2	46.6	22.5	154.9	23.6	22.3	18.7

COMPOUND = HYDRAZOBENZENE THETA C = 1

PARAMETER = BOD VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	285	2.4	8.64	2.52	400	40	1.967	1.950	1.00
04/06	274	1.7	8.78	2.53	420	40	1.830	1.819	1.00
04/08	269	1.4	9.22	3.13	410	0	1.933	1.923	1.00
04/11	276	4.2	8.93	3.13	500	0	1.575	1.551	1.00
04/13	276	3.1	9.65	3.02	490	8	1.737	1.717	1.00
04/15	258	2.8	9.79	2.63	470	32	1.717	1.698	1.00
04/18	248	4.2	9.07	3.13	390	0	1.843	1.811	1.00
04/20	292	5.1	8.64	2.63	430	32	1.874	1.842	1.00
04/22	268	3.0	9.65	3.13	510	0	1.620	1.602	1.00
04/25	288	2.6	9.22	3.13	470	0	1.805	1.789	1.00
04/27	290	3.3	9.36	2.82	420	20	2.065	2.041	1.00
04/29	280	3.3	8.93	2.80	450	24	1.775	1.754	1.00
05/02	273	6.0	9.79	3.13	320	0	2.668	2.610	1.00
05/04	285	12.6	10.08	2.67	390	24	2.353	2.249	1.00
05/06	274	12.4	9.65	3.13	510	0	1.656	1.581	1.00
05/09	303	11.7	9.07	2.70	360	24	2.439	2.345	1.00
05/11	249	10.6	8.93	3.13	310	0	2.292	2.194	1.00
05/13	243	7.8	8.93	3.13	300	0	2.311	2.237	1.00
05/16	269	8.2	9.22	3.13	480	0	1.645	1.594	1.00
05/18	280	7.2	9.07	3.13	490	0	1.656	1.613	1.00
05/20	294	6.2	9.07	3.13	680	0	1.253	1.226	1.00
05/23	198	10.7	8.64	3.00	540	12	1.012	0.957	1.00
05/25	263	3.6	9.36	2.97	490	12	1.605	1.583	1.00
MEAN	271	5.8	9.20	2.95	445	12	1.854	1.813	1.00
S.DEV	22	3.62	.4	.22	84.52	14.46	.37	.36	0
C V %	8.1	62.1	4.3	7.6	19	124.1	20.4	20.1	.1

COMPOUND = HYDRAZOBENZENE THETA C = 3

PARAMETER = BOD VOLUME-REACTOR = 3.14

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	285	2.0	9.50	0.94	970	12	0.889	0.883	3.00
04/06	274	1.6	9.50	0.97	1360	12	0.610	0.606	3.00
04/08	269	1.0	9.79	0.42	1070	72	0.784	0.781	2.99
04/11	276	2.7	8.93	1.05	1170	0	0.671	0.664	2.99
04/13	276	2.0	8.64	1.05	1090	0	0.697	0.692	2.99
04/15	258	1.8	9.79	1.05	1060	0	0.759	0.754	2.99
04/18	248	1.9	8.93	1.05	1290	0	0.547	0.543	2.99
04/20	292	3.2	8.78	0.86	1029	24	0.793	0.785	3.01
04/22	268	2.9	9.79	1.05	1200	0	0.696	0.689	2.99
04/25	288	2.8	9.65	1.05	860	0	1.029	1.019	2.99
04/27	290	2.5	9.65	0.57	1130	60	0.789	0.782	2.98
04/29	280	1.4	9.36	0.84	1000	24	0.835	0.830	3.01
05/02	273	2.8	9.07	1.05	1110	0	0.710	0.703	2.99
05/04	285	5.5	10.37	0.97	980	8	0.960	0.942	3.00
05/06	274	3.2	9.07	1.05	1270	0	0.623	0.616	2.99
05/09	303	4.2	9.64	1.00	1540	0	0.604	0.596	3.14
05/11	249	3.0	9.22	0.95	920	8	0.795	0.785	3.07
05/13	243	3.4	9.36	1.05	1480	0	0.489	0.483	2.99
05/16	268	2.6	9.22	1.05	1350	0	0.583	0.577	2.99
05/18	280	2.3	9.50	1.05	1130	0	0.750	0.744	2.99
05/20	294	3.3	9.79	1.05	1140	0	0.804	0.795	2.99
05/23	198	0.4	9.22	1.05	1290	0	0.451	0.450	2.99
05/25	263	0.8	9.36	1.00	1350	8	0.581	0.579	2.99
MEAN	271	2.5	9.40	0.96	1165	10	0.715	0.709	3.00
S.DEV	22	1.12	.39	.16	177.43	19.25	.14	.14	.03
C V %	8.1	45.2	4.2	16.8	15.2	194.2	20.1	20	1.1

COMPOUND = HYDRAZOBENZENE THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	285	1.0	9.79	0.24	2210	16	0.407	0.406	10.03
04/06	274	2.2	9.36	0.28	2280	8	0.363	0.360	9.94
04/08	269	0.3	9.50	0.31	1850	0	0.446	0.445	10.00
04/11	276	3.0	9.22	0.31	2520	0	0.326	0.322	10.00
04/13	276	2.4	8.64	0.31	2580	0	0.298	0.296	10.00
04/15	258	1.1	9.94	0.31	2350	0	0.352	0.351	10.00
04/18	248	1.2	9.36	0.31	2140	0	0.350	0.348	10.00
04/20	292	2.2	8.64	0.24	2570	20	0.317	0.314	10.15
04/22	268	1.5	9.94	0.31	2440	0	0.352	0.350	10.00
04/25	288	1.4	9.79	0.31	2200	0	0.413	0.411	10.00
04/27	290	2.1	9.50	0.28	2410	8	0.369	0.366	9.98
04/29	280	1.6	9.22	0.24	2560	20	0.325	0.323	9.99
05/02	273	0.6	9.22	0.31	2480	0	0.327	0.327	10.00
05/04	285	1.5	10.08	0.27	2600	12	0.356	0.355	9.83
05/06	274	1.1	9.36	0.31	2690	0	0.308	0.306	10.00
05/09	303	0.9	9.22	0.25	3050	4	0.295	0.295	11.84
05/11	249	0.0	8.93	0.31	2590	0	0.277	0.277	10.00
05/13	243	0.6	9.36	0.31	2290	0	0.320	0.320	10.00
05/16	268	1.6	9.79	0.31	2490	0	0.340	0.338	10.00
05/18	280	1.0	9.07	0.31	2570	0	0.319	0.318	10.00
05/20	294	2.8	9.07	0.31	2510	0	0.343	0.339	10.00
05/23	198	0.5	9.94	0.26	2750	14	0.231	0.230	10.02
05/25	263	1.8	9.22	0.29	2010	4	0.389	0.386	10.07
MEAN	271	1.4	9.40	0.29	2441	5	0.340	0.338	10.08
S.DEV	22	.78	.4	.02	256.95	6.96	.04	.04	.38
C V %	8.1	55.8	4.2	9.3	10.5	151.1	13.7	13.7	3.8

COMPOUND = HYDRAZOBENZENE　　THETA C = 1

PARAMETER = COD　　VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	530	27.0	9.22	3.13	410	0	3.808	3.614	1.00
04/13	450	14.0	9.65	3.02	490	8	2.831	2.743	1.00
04/22	445	10.0	9.65	3.13	510	0	2.690	2.630	1.00
04/29	400	30.0	8.93	2.80	450	24	2.536	2.346	1.00
05/06	390	44.0	9.65	3.13	510	0	2.358	2.092	1.00
05/11	390	34.0	8.93	3.13	310	0	3.589	3.276	1.00
05/20	420	26.0	9.07	3.13	680	0	1.790	1.679	1.00
05/25	365	10.0	9.36	2.97	490	12	2.228	2.167	1.00
MEAN	424	24.4	9.31	3.06	481	6	2.729	2.568	1.00
S.DEV	51.73	12.18	.31	.12	104.66	8.79	.67	.63	0
C V %	12.2	50	3.4	3.9	21.7	159.9	24.8	24.8	0

COMPOUND = HYDRAZOBENZENE THETA C = 3

PARAMETER = COD VOLUME-REACTOR = 3.14

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	530	33.0	9.79	0.42	1070	72	1.544	1.448	2.99
04/13	450	16.0	8.64	1.05	1090	0	1.136	1.096	2.99
04/22	445	10.0	9.79	1.05	1200	0	1.156	1.130	2.99
04/29	400	28.0	9.36	0.84	1000	24	1.192	1.109	3.01
05/06	390	20.0	9.07	1.05	1270	0	0.887	0.842	2.99
05/11	390	24.0	9.22	0.95	920	8	1.245	1.168	3.07
05/20	420	7.0	9.79	1.05	1140	0	1.149	1.130	2.99
05/25	365	18.0	9.36	1.00	1350	8	0.806	0.766	2.99
MEAN	424	19.5	9.38	0.93	1130	14	1.139	1.086	3.00
S.DEV	51.73	8.75	.4	.21	141.01	24.84	.22	.2	.02
C V %	12.2	44.8	4.3	23.4	12.4	177.4	19.7	19.2	.9

COMPOUND = HYDRAZOBENZENE THETA C = 10

PARAMETER = COD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	FSi / XV	F(Si-Se) / XV	TC
04/08	530	12.0	9.50	0.31	2580	0	0.630	0.615	10.00
04/13	450	11.0	8.64	0.31	2580	0	0.486	0.474	10.00
04/22	445	2.0	9.94	0.31	2440	0	0.585	0.582	10.00
04/29	400	20.0	9.22	0.24	2560	20	0.465	0.441	9.99
05/06	390	0.0	9.36	0.31	2690	0	0.438	0.438	10.00
05/11	390	19.0	8.93	0.31	2590	0	0.434	0.413	10.00
05/20	420	7.0	9.07	0.31	2510	0	0.490	0.481	10.00
05/25	365	10.0	9.22	0.29	2010	4	0.540	0.525	10.07
MEAN	424	10.1	9.24	0.30	2495	3	0.508	0.496	10.01
S.DEV	51.73	7.16	.38	.02	208.46	7.01	.07	.07	.02
C V %	12.2	70.7	4.2	8.2	8.3	233.6	13.8	14.5	.2

COMPOUND = HYDRAZOBENZENE　　THETA C = 1

PARAMETER = TOC　　VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	219	24.0	8.64	2.52	400	40	1.511	1.346	1.00
04/06	225	34.0	8.78	2.53	420	40	1.503	1.276	1.00
04/08	232	30.0	9.22	3.13	410	0	1.667	1.451	1.00
04/11	238	22.5	8.93	3.13	500	0	1.358	1.230	1.00
04/13	219	25.0	9.65	3.02	490	8	1.378	1.221	1.00
04/15	223	29.5	9.79	2.63	470	32	1.484	1.288	1.00
04/18	199	25.2	9.07	3.13	390	0	1.479	1.291	1.00
04/20	219	39.0	8.64	2.68	430	32	1.406	1.156	1.00
04/22	215	26.5	9.65	3.13	510	0	1.300	1.140	1.00
04/25	185	26.5	9.22	3.13	470	0	1.159	0.993	1.00
04/27	208	30.0	9.36	2.82	420	20	1.481	1.267	1.00
04/29	177	28.0	8.93	2.80	450	24	1.119	0.942	1.00
05/02	155	24.0	9.79	3.13	320	0	1.515	1.280	1.00
05/04	170	39.0	10.08	2.67	390	24	1.404	1.082	1.00
05/06	186	30.5	9.65	3.13	510	0	1.121	0.937	1.00
05/09	205	31.5	9.07	2.70	360	24	1.650	1.397	1.00
05/11	164	33.0	8.93	3.13	310	0	1.509	1.206	1.00
05/16	203	29.0	9.22	3.13	480	0	1.246	1.068	1.00
05/18	197	28.0	9.07	3.13	490	0	1.165	0.999	1.00
05/20	180	30.5	9.07	3.13	680	0	0.767	0.637	1.00
05/23	212	49.0	8.64	3.00	540	12	1.084	0.833	1.00
05/25	194	44.5	9.36	2.97	490	12	1.184	0.912	1.00
MEAN	201	30.9	9.22	2.94	451	12	1.340	1.134	1.00
S.DEV	22.67	6.74	.4	.22	80.25	14.57	.21	.2	0
C V %	11.2	21.8	4.4	7.7	17.7	119.6	16	17.7	.1

COMPOUND = HYDRAZOBENZENE   THETA C = 3

PARAMETER = TOC   VOLUME-REACTOR = 3.14

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	219	43.0	9.50	0.94	970	12	0.683	0.549	3.00
04/06	225	25.5	9.30	0.97	1360	12	0.501	0.444	3.00
04/08	232	29.0	9.79	0.42	1070	72	0.676	0.592	2.99
04/11	238	19.0	8.93	1.05	1170	0	0.579	0.532	2.99
04/13	219	17.0	8.64	1.05	1090	0	0.553	0.510	2.99
04/15	223	22.5	9.79	1.05	1060	0	0.656	0.590	2.99
04/18	199	19.0	8.93	1.05	1290	0	0.439	0.397	2.99
04/20	219	20.0	8.78	0.86	1029	24	0.595	0.541	3.01
04/22	215	23.5	9.79	1.05	1200	0	0.559	0.498	2.99
04/25	185	22.0	9.65	1.05	860	0	0.661	0.582	2.99
04/27	208	31.0	9.65	0.57	1130	60	0.566	0.481	2.98
04/29	177	14.5	9.36	0.84	1000	24	0.526	0.483	3.01
05/02	155	11.5	9.07	1.05	1110	0	0.403	0.373	2.99
05/04	170	17.0	10.37	0.97	980	8	0.573	0.516	3.00
05/06	186	17.5	9.07	1.05	1270	0	0.422	0.382	2.99
05/09	205	20.0	9.64	1.00	1540	0	0.409	0.369	3.14
05/11	164	18.0	9.22	0.95	920	8	0.523	0.466	3.07
05/16	203	18.5	9.22	1.05	1350	0	0.442	0.401	2.99
05/18	197	16.0	9.50	1.05	1130	0	0.527	0.485	2.99
05/20	180	13.0	9.79	1.05	1140	0	0.492	0.457	2.99
05/23	212	23.5	9.22	1.05	1290	0	0.483	0.429	2.99
05/25	194	21.5	9.36	1.00	1350	8	0.428	0.381	2.99
MEAN	201	21.0	9.40	0.96	1150	10	0.532	0.475	3.00
S.DEV	22.67	6.81	.4	.16	167.43	19.58	.08	.07	.03
C V %	11.2	32.4	4.3	17.1	14.5	188.9	16.5	15.1	1.1

COMPOUND = HYDRAZOBENZENE THETA C = 10

PARAMETER = TOC VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	219	19.5	9.79	0.24	2210	16	0.313	0.285	10.03
04/06	225	13.0	9.36	0.28	2280	8	0.298	0.281	9.94
04/08	232	12.0	9.50	0.31	1850	0	0.384	0.364	10.00
04/11	238	29.0	9.22	0.31	2520	0	0.281	0.247	10.00
04/13	219	19.0	8.64	0.31	2580	0	0.237	0.216	10.00
04/15	223	18.0	9.94	0.31	2350	0	0.304	0.280	10.00
04/18	199	19.0	9.36	0.31	2140	0	0.281	0.254	10.00
04/20	219	19.5	8.64	0.24	2570	20	0.237	0.216	10.15
04/22	215	17.0	9.94	0.31	2440	0	0.283	0.260	10.00
04/25	195	25.0	9.79	0.31	2200	0	0.266	0.230	10.00
04/27	208	18.5	9.50	0.28	2410	8	0.264	0.241	9.98
04/29	177	25.0	9.22	0.24	2560	20	0.206	0.177	9.99
05/02	155	15.0	9.22	0.31	2480	0	0.186	0.168	10.00
05/04	170	16.5	10.08	0.27	2600	12	0.213	0.192	9.83
05/06	186	14.0	9.36	0.31	2690	0	0.209	0.193	10.00
05/09	205	14.5	9.22	0.25	3050	4	0.200	0.186	11.84
05/11	164	15.0	8.93	0.31	2590	0	0.182	0.166	10.00
05/16	203	11.0	9.79	0.31	2490	0	0.257	0.244	10.00
05/18	197	10.0	9.07	0.31	2570	0	0.224	0.213	10.00
05/20	180	19.0	9.07	0.31	2510	0	0.210	0.188	10.00
05/23	212	27.0	9.94	0.26	2750	14	0.247	0.216	10.02
05/25	194	17.0	9.22	0.29	2010	4	0.287	0.262	10.07
MEAN	201	17.9	9.40	0.29	2448	5	0.253	0.231	10.08
S.DEV	22.63	5.03	.41	.02	250.83	7.05	.04	.04	.39
C V %	11.2	23.1	4.3	9.4	10.6	146.4	19.4	20.6	3.9

COMPOUND = COMBINED THETA C = 1

PARAMETER = BOD VOLUME-REACTOR = 2.945

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	235	1.9	8.96	2.23	400	32	1.787	1.773	1.06
04/06	274	1.0	8.93	2.00	440	46	1.888	1.881	1.08
04/08	252	1.3	8.93	2.72	404	10	1.891	1.882	1.02
04/11	274	3.7	8.93	2.76	382	8	2.175	2.146	1.02
04/13	281	2.2	8.93	2.55	407	18	2.094	2.077	1.04
04/15	244	2.4	8.90	2.95	260	0	2.836	2.808	1.00
04/18	267	3.0	8.60	2.95	290	0	2.689	2.658	1.00
04/20	244	3.9	8.93	1.76	349	40	2.120	2.086	1.14
04/22	198	3.3	8.93	2.95	280	0	2.144	2.109	1.00
04/25	292	2.2	8.96	2.95	580	0	1.532	1.520	1.00
04/27	279	3.2	8.93	2.61	636	24	1.330	1.315	1.03
04/29	300	2.6	8.64	2.92	610	4	1.443	1.430	1.00
05/02	271	8.2	8.93	2.95	450	0	1.826	1.771	1.00
05/04	243	4.3	8.93	2.95	4330	0	0.170	0.167	1.00
05/06	271	4.4	8.80	2.95	490	0	1.653	1.626	1.00
05/09	274	4.4	8.90	2.95	540	0	1.533	1.509	1.00
05/11	274	5.5	8.86	2.95	490	0	1.682	1.649	1.00
05/13	253	7.0	8.90	2.95	434	0	1.762	1.713	1.00
05/16	271	3.2	8.90	2.95	518	0	1.581	1.562	1.00
05/18	310	3.1	8.60	2.95	512	0	1.768	1.750	1.00
05/20	322	7.8	8.93	2.95	650	0	1.502	1.466	1.00
05/23	216	0.8	8.93	2.95	420	0	1.559	1.554	1.00
05/25	252	2.9	8.90	2.95	502	0	1.517	1.500	1.00
MEAN	265	3.6	8.88	2.77	625	8	1.760	1.737	1.02
S.DEV	28.4	1.98	.1	.33	814.72	14.1	.51	.5	.03
C V %	10.7	55.4	1.2	12.1	130.3	178.3	29	29.1	3.5

COMPOUND = COMBINED

PARAMETER = BOD

THETA C = 3

VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	235	2.0	9.22	1.01	1010	0	0.692	0.686	3.07
04/06	274	0.8	9.22	1.01	1190	0	0.685	0.683	3.07
04/08	252	0.9	9.22	1.01	1060	0	0.707	0.705	3.07
04/11	274	3.9	9.22	1.00	1190	0	0.685	0.675	3.10
04/13	281	2.0	8.35	1.00	1120	0	0.676	0.671	3.10
04/15	244	2.1	9.22	0.90	1280	20	0.567	0.562	3.01
04/18	267	1.9	9.36	1.00	1100	4	0.733	0.728	3.01
04/20	244	1.8	9.22	1.03	1160	0	0.626	0.621	3.01
04/22	198	1.9	9.22	1.03	1120	0	0.526	0.521	3.01
04/25	292	2.2	8.64	1.01	1200	4	0.678	0.673	2.99
04/27	279	1.6	9.22	1.00	1070	4	0.776	0.771	3.01
04/29	300	1.2	8.93	1.03	1210	0	0.714	0.711	3.01
05/02	271	1.4	8.93	0.77	1110	36	0.703	0.700	3.00
05/06	271	2.0	9.50	1.03	980	0	0.847	0.841	3.01
05/09	274	3.8	9.22	1.03	1420	0	0.574	0.566	3.01
05/11	274	1.4	9.50	1.01	1210	4	0.694	0.690	2.99
05/13	253	1.9	9.22	1.03	1190	0	0.632	0.628	3.01
05/16	270	1.9	9.22	1.03	1180	0	0.681	0.676	3.01
05/18	310	5.1	9.22	1.03	1200	0	0.768	0.756	3.01
05/20	322	3.0	8.93	1.03	1040	0	0.892	0.884	3.01
05/23	216	0.2	9.22	1.00	1150	4	0.559	0.558	3.01
05/25	252	2.9	8.93	1.03	1170	0	0.620	0.613	3.01
MEAN	266	2.1	9.13	1.00	1153	3	0.683	0.678	3.02
S.DEV	28.64	1.1	.26	.05	94.87	8.48	.08	.08	.03
C V %	10.7	52.9	2.8	5.8	8.2	245.7	13	13	1.1

COMPOUND = COMBINED THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	235	1.7	9.22	0.31	2300	0	0.301	0.299	10.10
04/06	274	1.5	9.07	0.23	2410	24	0.329	0.328	9.84
04/08	252	0.2	9.22	0.31	2320	0	0.320	0.320	10.10
04/11	274	2.8	9.50	0.07	2480	64	0.335	0.332	9.99
04/13	281	2.4	8.93	0.15	2570	48	0.312	0.309	9.97
04/15	244	2.0	9.65	0.00	2130	116	0.353	0.350	5.96
04/18	267	2.3	9.22	0.31	2260	0	0.348	0.345	10.10
04/20	244	1.5	9.07	0.14	1900	36	0.372	0.370	10.12
04/22	198	1.8	9.65	0.31	2080	0	0.293	0.291	10.10
04/25	292	2.2	9.07	0.31	2080	0	0.407	0.404	10.10
04/27	279	1.0	9.22	0.28	1920	8	0.428	0.427	9.87
04/29	300	0.8	9.36	0.18	1840	28	0.488	0.486	9.79
05/02	271	0.2	9.22	0.31	2020	0	0.395	0.395	10.10
05/04	243	1.5	9.79	0.31	1840	0	0.413	0.411	10.10
05/06	271	2.3	9.07	0.31	1570	0	0.500	0.496	10.10
05/09	274	0.6	9.22	0.00	1760	64	0.459	0.458	9.34
05/11	274	1.4	9.22	0.00	1810	228	0.446	0.444	2.69
05/13	253	0.8	9.50	0.31	1480	0	0.519	0.517	10.10
05/16	270	0.8	9.22	0.31	1460	0	0.545	0.543	10.10
05/18	310	2.7	8.92	0.00	1070	128	0.826	0.818	2.93
05/20	322	2.3	9.79	0.00	1120	114	0.899	0.893	3.14
05/23	216	0.3	9.22	0.31	1270	0	0.501	0.500	10.10
05/25	252	1.9	9.07	0.29	1300	4	0.562	0.557	9.87
MEAN	265	1.5	9.28	0.21	1869	37	0.450	0.447	8.89
S.DEV	28.39	.8	.25	.12	436.41	58.67	.15	.15	2.51
C V %	10.7	52.8	2.7	62.8	23.3	156.5	34.1	34	28.2

COMPOUND = COMBINED
THETA C = 1

PARAMETER = TOC
VOLUME-REACTOR = 2.945

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	185	33.5	8.96	2.23	400	32	1.407	1.152	1.06
04/06	187	23.0	8.93	2.00	440	46	1.289	1.130	1.08
04/08	212	24.0	8.93	2.72	404	10	1.591	1.411	1.02
04/11	216	24.5	8.93	2.76	382	8	1.715	1.520	1.02
04/13	219	19.0	8.93	2.55	407	18	1.632	1.490	1.04
04/15	223	20.0	8.90	2.95	260	0	2.592	2.360	1.00
04/18	207	21.5	8.60	2.95	290	0	2.084	1.868	1.00
04/20	212	23.0	8.93	1.76	349	40	1.842	1.642	1.14
04/22	188	19.0	8.93	2.93	280	0	2.036	1.830	1.01
04/25	119	24.0	8.96	2.95	580	0	0.624	0.498	1.00
04/27	118	52.0	8.93	2.61	636	24	0.563	0.315	1.03
04/29	216	24.0	8.64	2.92	610	4	1.039	0.923	1.00
05/02	200	27.5	8.93	2.95	450	0	1.348	1.162	1.00
05/04	119	19.0	8.93	2.95	433	0	0.833	0.700	1.00
05/06	203	20.0	8.80	2.95	490	0	1.238	1.116	1.00
05/09	178	25.5	8.90	2.95	540	0	0.996	0.853	1.00
05/11	196	22.0	8.86	2.95	490	0	1.203	1.068	1.00
05/13	251	28.0	8.90	2.95	434	0	1.748	1.553	1.00
05/16	140	21.5	8.90	2.95	518	0	0.817	0.691	1.00
05/18	192	16.5	8.60	2.95	512	0	1.095	1.001	1.00
05/20	181	21.0	8.93	2.95	650	0	0.844	0.746	1.00
05/23	202	22.5	8.93	2.95	420	0	1.458	1.296	1.00
05/25	198	15.5	8.90	2.95	502	0	1.192	1.099	1.00
MEAN	190	23.8	8.88	2.77	456	8	1.356	1.192	1.02
S.DEV	34.9	7.28	.1	.33	107.08	14.1	.5	.47	.03
C V %	18.4	30.6	1.2	12.1	23.5	178.3	37	40	3.5

COMPOUND = COMBINED THETA C = 3

PARAMETER = TOC VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	185	29.0	9.22	1.01	1010	0	0.545	0.459	3.07
04/06	187	21.0	9.22	1.01	1190	0	0.467	0.415	3.07
04/08	212	17.0	9.22	1.01	1060	0	0.595	0.547	3.07
04/11	216	23.0	9.22	1.00	1190	0	0.540	0.482	3.10
04/13	219	20.0	8.35	1.00	1120	0	0.527	0.479	3.10
04/15	223	20.0	9.22	0.90	1280	20	0.518	0.472	3.01
04/18	207	21.0	9.36	1.00	1100	4	0.568	0.511	3.01
04/20	212	19.0	9.22	1.03	1160	0	0.544	0.495	3.01
04/22	189	20.0	9.22	1.03	1120	0	0.502	0.449	3.01
04/25	119	23.0	8.64	1.01	1200	4	0.276	0.223	2.99
04/27	118	19.0	9.22	1.00	1070	4	0.328	0.275	3.01
04/29	216	23.0	8.93	1.03	1210	0	0.514	0.459	3.01
05/02	200	14.0	8.93	0.77	1110	36	0.519	0.483	3.00
05/06	203	14.0	9.50	1.03	980	0	0.635	0.591	3.01
05/09	178	19.0	9.22	1.03	1420	0	0.373	0.333	3.01
05/11	196	19.0	9.50	1.01	1210	4	0.496	0.448	2.99
05/16	140	17.0	9.22	1.03	1180	0	0.353	0.310	3.01
05/18	192	17.0	9.22	1.03	1200	0	0.476	0.434	3.01
05/20	181	21.0	8.93	1.03	1040	0	0.501	0.443	3.01
05/23	202	20.0	9.22	1.00	1150	4	0.522	0.471	3.01
05/25	201	21.0	8.93	1.03	1170	0	0.495	0.443	3.01
MEAN	190	19.9	9.13	1.00	1151	4	0.490	0.439	3.02
S.DEV	30.08	3.27	.26	.05	96.84	8.66	.08	.08	.03
C V %	15.8	16.4	2.9	5.9	8.4	239.3	18	19.9	1.1

COMPOUND = COMBINED THETA C = 10

PARAMETER = TOC VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/04	85	20.5	9.22	0.31	2300	0	0.109	0.083	10.10
04/06	187	19.5	9.07	0.23	2410	24	0.225	0.201	9.84
04/08	212	15.6	9.22	0.31	2320	0	0.269	0.249	10.10
04/11	216	21.0	9.50	0.07	2480	64	0.264	0.239	9.99
04/13	219	24.5	8.93	0.15	2570	48	0.243	0.216	9.97
04/15	223	22.5	9.65	0.00	2130	116	0.323	0.290	5.96
04/18	207	21.5	9.22	0.31	2260	0	0.270	0.242	10.10
04/20	212	23.0	9.07	0.14	1900	36	0.323	0.288	10.12
04/22	189	19.0	9.65	0.31	2080	0	0.280	0.252	10.10
04/25	119	22.0	9.07	0.31	2080	0	0.166	0.135	10.10
04/27	118	14.0	9.22	0.28	1920	8	0.181	0.160	9.87
04/29	216	18.5	9.36	0.18	1840	28	0.351	0.321	9.79
05/02	200	11.5	9.22	0.31	2020	0	0.292	0.275	10.10
05/04	199	16.5	9.79	0.31	1840	0	0.338	0.310	10.10
05/06	203	14.0	9.07	0.31	1570	0	0.375	0.349	10.10
05/09	178	11.5	9.22	0.00	1760	64	0.298	0.279	9.34
05/11	196	19.0	9.22	0.00	1810	228	0.319	0.288	2.69
05/16	140	7.0	9.22	0.31	1460	0	0.282	0.268	10.10
05/18	192	12.5	8.92	0.00	1070	128	0.511	0.478	2.93
05/20	181	14.0	9.79	0.00	1120	114	0.505	0.466	3.14
05/23	202	16.5	9.22	0.31	1270	0	0.469	0.430	10.10
05/25	201	16.5	9.07	0.29	1300	4	0.448	0.411	9.87
MEAN	186	17.3	9.27	0.20	1887	39	0.311	0.283	8.84
S.DEV	37.06	4.47	.25	.13	438.16	59.47	.1	.1	2.56
C V %	19.9	25.8	2.7	64.8	23.2	151.7	33.4	35.3	28.9

```
----------------------------------------------------------------------------

     COMPOUND = COMBINED                  THETA C = 1

     PARAMETER = COD                      VOLUME-REACTOR = 2.945

--------------------------------------------------------------------------------
     DATE     Si      Se       F     Fw      X      Xe     FSi     F(Si-Se)   TC
     1983                                                  ---     --------
                                                           XV        XV
--------------------------------------------------------------------------------

     04/08    515    21.0    8.93   2.72    404     10    3.865   3.708     1.02
     04/13    475    11.5    8.93   2.55    407     18    3.539   3.453     1.04
     04/22    330    16.0    8.93   2.95    280      0    3.574   3.400     1.00
     04/29    400    44.0    8.64   2.92    610      4    1.924   1.712     1.00
     05/06    360    10.0    8.80   2.95    490      0    2.195   2.134     1.00
     05/11    370    20.0    8.86   2.95    490      0    2.272   2.149     1.00
     05/18    382    17.0    8.60   2.95    512      0    2.179   2.082     1.00
     05/25    415     8.0    8.90   2.95    502      0    2.498   2.450     1.00

     MEAN     406    18.4    8.82   2.87    462      4    2.756   2.636     1.01
     S.DEV  61.55   11.33     .13    .15  97.89   6.67     .77     .76      .01
     C V %  15.1     61.4     1.5    5.2   21.1  166.9    27.9    28.9      1.6

----------------------------------------------------------------------------
```

COMPOUND = COMBINED THETA C = 3

PARAMETER = COD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	515	9.0	9.22	1.01	1060	0	1.445	1.420	3.07
04/13	475	12.0	8.35	1.00	1120	0	1.142	1.113	3.10
04/22	330	4.0	9.22	1.03	1120	0	0.876	0.866	3.01
04/29	400	12.0	8.93	1.03	1210	0	0.952	0.924	3.01
05/06	360	0.0	9.50	1.03	980	0	1.126	1.126	3.01
05/13	370	0.0	9.22	1.03	1190	0	0.925	0.925	3.01
05/20	382	13.0	8.93	1.03	1040	0	1.058	1.022	3.01
05/25	415	8.0	8.93	1.03	1170	0	1.022	1.002	3.01
MEAN	406	7.3	9.04	1.02	1111	0	1.068	1.050	3.03
S.DEV	61.55	5.31	.34	.01	79.72	0	.17	.17	.03
C V %	15.1	73.2	3.7	1.1	7.1	282.8	16.7	16.7	1.1

COMPOUND = COMBINED THETA C = 10

PARAMETER = COD VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
04/08	515	9.0	9.22	0.31	2320	0	0.654	0.642	10.10
04/13	475	9.0	8.93	0.15	2570	48	0.527	0.517	9.97
04/22	330	3.0	9.65	0.31	2080	0	0.489	0.485	10.10
04/29	400	12.0	9.36	0.18	1840	28	0.650	0.631	9.79
05/06	360	0.0	9.07	0.31	1570	0	0.664	0.664	10.10
05/11	370	8.0	9.22	0.00	1810	228	0.602	0.589	2.69
05/20	382	6.0	9.79	0.00	1120	114	1.067	1.050	3.14
05/25	415	6.0	9.07	0.29	1300	4	0.925	0.912	9.87
MEAN	406	6.6	9.29	0.19	1826	53	0.697	0.656	8.22
S.DEV	61.55	3.77	.29	.13	493.26	80.9	.19	.19	3.27
C V %	15.1	57	3.2	69.5	27	153.3	28.4	26.4	39.8

COMPOUND = NICKEL

THETA C = 1

PARAMETER = BOD

VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	210	17.0	9.50	2.75	230	12	2.798	2.572	1.00
07/06/83	197	15.3	9.36	2.18	280	44	2.124	1.959	0.94
07/08/83	231	12.6	9.50	2.54	300	4	2.360	2.231	1.18
07/11/83	204	12.3	9.22	2.71	330	20	1.839	1.728	1.00
07/13/83	230	12.0	9.22	2.62	330	24	2.073	1.965	1.00
07/15/83	193	10.0	9.22	2.53	280	24	2.050	1.944	1.00
07/18/83	247	12.0	9.22	1.91	270	44	2.721	2.589	1.00
07/20/83	247	9.0	8.93	2.04	260	40	2.737	2.637	1.00
07/22/83	192	7.0	9.22	2.23	290	36	1.969	1.897	1.00
07/25/83	228	3.0	9.22	2.67	430	28	1.577	1.556	1.00
07/27/83	220	2.0	9.22	2.91	440	16	1.487	1.474	0.99
07/29/83	216	3.0	9.22	2.88	460	16	1.397	1.377	1.00
08/01/83	280	4.5	9.50	2.85	630	24	1.362	1.340	1.00
08/03/83	272	3.5	9.22	2.40	350	36	2.311	2.282	1.00
08/05/83	267	10.0	8.93	2.29	490	60	1.570	1.511	1.00
08/08/83	100	15.0	9.22	2.49	310	28	0.959	0.816	1.00
08/10/83	114	6.5	8.93	1.92	310	52	1.059	0.999	1.00
08/12/83	205	5.5	9.22	1.69	320	60	1.905	1.854	1.00
MEAN	214	8.9	9.23	2.42	351	32	1.905	1.818	1.01
S.DEV	47.21	4.71	.17	.36	101.25	16.11	.55	.52	.04
C V %	22	52.9	1.8	15	28.8	51	28.9	28.8	4.5

```
-------------------------------------------------------------------------

   COMPOUND = NICKEL                    THETA C = 3

   PARAMETER = BOD                      VOLUME-REACTOR = 3.1

-----------------------------------------------------------------------------
   DATE      Si      Se       F     Fw      X      Xe     FSi    F(Si-Se)  TC
   1983                                                   ---    --------
                                                           XV       XV
-----------------------------------------------------------------------------

   07/04/83   210     2.0    9.22  0.00    330     44    1.893  1.875     2.52
   07/06/83   197     2.6    9.07  0.65    440     20    1.310  1.293     3.00
   07/08/83   231     5.5    9.22  0.00    390     56    1.762  1.720     2.34
   07/11/83   204     2.4    8.93  0.00    420     76    1.399  1.383     1.92
   07/13/83   230     8.0    9.50  0.07    430     44    1.639  1.582     3.00
   07/15/83   193     3.0    9.50  0.91    550      8    1.075  1.059     3.00
   07/18/83   247     4.0    9.50  0.54    660     36    1.147  1.128     3.01
   07/20/83   247     3.5    9.22  0.74    570     20    1.289  1.271     2.99
   07/22/83   192     3.0    9.50  1.03    960      0    0.613  0.603     3.01
   07/25/83   228     1.5    9.50  0.77    800     24    0.873  0.868     3.00
   07/27/83   220     0.5    9.50  0.99    780      4    0.864  0.862     3.00
   07/29/83   216     3.0    9.50  0.99    770      4    0.860  0.848     3.00
   08/01/83   280     2.5    9.36  0.97   1030      8    0.821  0.813     2.99
   08/03/83   272     1.5    8.93  0.97    950      8    0.825  0.820     2.99
   08/05/83   267     3.5    9.22  0.98   1180      8    0.673  0.664     2.99
   08/08/83   100     3.5    9.50  0.85    940     20    0.326  0.315     3.00
   08/10/83   114     2.5    9.22  1.03    920      0    0.369  0.360     3.01
   08/12/83   205     2.0    9.22  0.91    830     12    0.735  0.727     3.01

   MEAN    214     3.0    9.31   0.69    719     22     1.026  1.011      2.88
   S.DEV 47.21    1.65     .2     .39  254.33  21.35   .44     .44       .3
   C V % 22       54.7    2.1    56.9  35.3   98      43.8   43.5       10.5

-------------------------------------------------------------------------
```

COMPOUND = NICKEL THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.3

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	210	1.0	9.78	0.31	1870	4	0.333	0.331	9.99
07/06/83	197	1.4	9.65	0.33	2080	0	0.277	0.275	10.00
07/08/83	231	0.3	9.78	0.33	2160	0	0.317	0.317	10.00
07/11/83	204	2.0	9.78	0.33	2260	0	0.268	0.265	10.00
07/13/83	230	1.0	9.78	0.33	2250	0	0.303	0.302	10.00
07/15/83	193	0.8	9.78	0.29	2060	8	0.278	0.277	10.10
07/18/83	247	1.5	9.78	0.27	2470	16	0.296	0.295	9.95
07/20/83	247	1.0	9.50	0.23	1920	20	0.370	0.369	10.11
07/22/83	192	0.8	9.78	0.30	2170	0	0.262	0.261	11.00
07/25/83	228	0.5	9.78	0.31	2260	4	0.299	0.298	10.10
07/27/83	220	0.5	9.78	0.31	2080	4	0.313	0.313	10.05
07/29/83	216	1.5	9.78	0.27	2070	12	0.309	0.307	10.15
08/01/83	280	1.5	9.78	0.30	2270	8	0.366	0.364	9.90
08/03/83	272	1.0	10.00	0.30	2520	8	0.327	0.326	9.98
08/05/83	267	1.0	9.78	0.28	2390	12	0.331	0.330	10.07
08/08/83	100	1.0	9.78	0.33	2190	0	0.135	0.134	10.00
08/10/83	114	1.0	9.50	0.33	2230	0	0.147	0.146	10.00
08/12/83	205	0.5	9.79	0.31	2200	4	0.276	0.276	10.08
MEAN	214	1.0	9.75	0.30	2192	6	0.289	0.288	10.08
S.DEV	47.21	.43	.11	.02	168.18	6.15	.06	.06	.23
C V %	22	42.8	1.1	9	7.6	110.8	21.3	21.4	2.3

```
------------------------------------------------------------------------------

    COMPOUND = NICKEL                      THETR C = 1

    PARAMETER = COD                        VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
    DATE     Si      Se       F     Fw       X       Xe     FSi    F(Si-Se)    TC
    1983                                                    ---    --------
                                                            XV        XV
----------------------------------------------------------------------------------

    07/08/83   420    55.0    9.50   2.54    300      4    4.290   3.728     1.18
    07/15/83   290    47.0    9.22   2.53    280     24    3.080   2.581     1.00
    07/22/83   315    23.0    9.22   2.23    290     36    3.231   2.995     1.00
    07/29/83   310    20.0    9.22   2.88    460     16    2.004   1.875     1.00
    08/05/83   290    33.0    8.93   2.29    490     60    1.705   1.511     1.00
    08/12/83   280    29.0    9.22   1.69    320     60    2.602   2.333     1.00

    MEAN    318    34.5    9.22   2.36    357     33     2.819   2.504      1.03
    S.DEV 51.93    13.79    .16    .4   93.09   23.14    .93     .79       .07
    C V % 16.3     39.9    1.9   16.9   26.1    69.4    33.1    31.7       7
------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------

     COMPOUND = NICKEL                      THETA C = 3

     PARAMETER = COD                        VOLUME-REACTOR = 3.1

------------------------------------------------------------------------------------
     DATE     Si      Se        F     Fw       X      Xe      FSi   F(Si-Se)   TC
     1983                                                     ---   --------
                                                              XV      XV
------------------------------------------------------------------------------------

     07/08/83   420    50.0    9.22  0.00    390     56    3.203  2.822       2.34
     07/15/83   290    63.0    9.50  0.91    550      8    1.616  1.265       3.00
     07/22/83   315    52.0    9.50  1.03    960      0    1.006  0.840       3.01
     07/29/83   310    35.0    9.50  0.99    770      4    1.234  1.094       3.00
     08/05/83   290    26.0    9.22  0.98   1180      8    0.731  0.665       2.99
     08/12/83   280    25.0    9.22  0.91    830     12    1.003  0.914       3.01

     MEAN    318    41.8   9.36  0.80    790     15    1.465  1.267      2.89
     S.DEV 51.93    15.48   .15   .39  282.84  20.65  .9      .78       .26
     C V % 16.3     37      1.6   49.3  36.2  140.8  61.4    62.3       9.3

--------------------------------------------------------------------------------
```

COMPOUND = NICKEL
PARAMETER = COD

THETA C = 10
VOLUME-REACTOR = 3.3

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/08/83	420	19.0	9.78	0.33	2160	0	0.576	0.550	10.00
07/15/83	290	33.0	9.78	0.29	2060	8	0.417	0.370	10.10
07/22/83	315	41.0	9.78	0.30	2170	0	0.430	0.374	11.00
07/29/83	310	19.0	9.78	0.27	2070	12	0.444	0.417	10.15
08/05/83	290	15.0	9.78	0.28	2390	12	0.360	0.341	10.07
08/12/83	280	12.0	9.79	0.31	2200	4	0.378	0.361	10.08
MEAN	318	23.2	9.78	0.30	2175	6	0.434	0.402	10.23
S.DEV	51.93	11.32	0	.02	119.45	5.51	.07	.07	.37
C V %	16.3	48.8	0	7.2	5.4	91.8	17.6	19	3.6

COMPOUND = NICKEL

THETA C = 1

PARAMETER = TOC

VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	158	50.0	9.50	2.75	230	12	2.105	1.439	1.00
07/06/83	172	63.0	9.36	2.18	280	44	1.855	1.175	0.94
07/08/83	164	45.0	9.50	2.54	300	4	1.675	1.216	1.18
07/11/83	146	28.0	9.22	2.71	330	20	1.316	1.064	1.00
07/13/83	166	24.0	9.22	2.62	330	24	1.496	1.280	1.00
07/15/83	169	63.0	9.22	2.53	280	24	1.795	1.126	1.00
07/18/83	165	26.0	9.22	1.91	270	44	1.818	1.531	1.00
07/20/83	183	14.0	8.93	2.04	260	40	2.028	1.872	1.00
07/22/83	181	7.0	9.22	2.23	290	36	1.856	1.785	1.00
MEAN	167	35.6	9.27	2.39	286	28	1.772	1.387	1.01
S.DEV	11.27	20.51	.17	.3	32.05	14.34	.24	.29	.06
C V %	6.7	57.6	1.8	12.8	11.2	52	13.9	20.9	6.4

```
------------------------------------------------------------------------------

    COMPOUND = NICKEL                      THETA C = 3

    PARAMETER = TOC                        VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
    DATE      Si      Se       F     Fw      X      Xe     FSi    F(Si-Se)    TC
    1983                                                   ---    --------
                                                           XV        XV
----------------------------------------------------------------------------------

    07/04/83   158    53.0    9.22  0.00    330     44   1.424  0.946      2.52
    07/06/83   172    42.0    9.07  0.65    440     20   1.144  0.864      3.00
    07/08/83   164    35.0    9.22  0.00    390     56   1.251  0.984      2.34
    07/11/83   146    21.0    8.93  0.00    420     76   1.001  0.857      1.92
    07/13/83   166    31.0    9.50  0.07    430     44   1.183  0.962      3.00
    07/15/83   169     8.0    9.50  0.91    550      8   0.942  0.897      3.00
    07/18/83   165    19.0    9.50  0.54    660     36   0.766  0.678      3.01
    07/20/83   183    22.0    9.22  0.74    570     20   0.955  0.840      2.99
    07/22/83   181     8.0    9.50  1.03    960      0   0.578  0.552      3.01

    MEAN     167    26.6    9.30  0.44    528      34    1.027  0.842      2.75
    S.DEV  11.27    15.1     .21   .42  191.55  24.17     .25    .14       .4
    C V % 6.7       56.8     2.3   96.6  36.2   71.5     25     16.7       14.5
------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND = NICKEL                        THETA C = 10

     PARAMETER = TOC                          VOLUME-REACTOR = 3.3

-----------------------------------------------------------------------------------
     DATE     Si      Se       F     Fw       X       Xe     FSi    F(Si-Se)   TC
     1983                                                    ---    --------
                                                              XV       XV
-----------------------------------------------------------------------------------

     07/04/83   158   27.0    9.78  0.31   1870     4     0.250  0.208      9.99
     07/06/83   172   20.0    9.65  0.33   2080     0     0.242  0.214     10.00
     07/08/83   164   15.0    9.78  0.33   2160     0     0.225  0.204     10.00
     07/11/83   146    7.0    9.78  0.33   2260     0     0.191  0.182     10.00
     07/13/83   166    5.0    9.78  0.33   2250     0     0.219  0.212     10.00
     07/15/83   169    2.0    9.78  0.29   2060     8     0.243  0.240     10.10
     07/18/83   165   24.0    9.78  0.27   2470    16     0.198  0.169      9.95
     07/20/83   183   22.0    9.50  0.23   1920    20     0.274  0.241     10.11
     07/22/83   181   11.0    9.78  0.30   2170     0     0.247  0.232     11.00

     MEAN    167    14.8    9.73   0.30   2138     5    0.232  0.211      10.13
     S.DEV 11.27    8.99     .09    .03  183.01  7.74    .02    .02        .33
     C V % 6.7      60.8    1      11.4   8.5   145.2  11.4   11.6        3.2
-------------------------------------------------------------------------------
```

COMPOUND = CADMIUM　THETA C = 1

PARAMETER = BOD　VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	220	1.5	9.50	3.04	470	6	1.403	1.393	1.02
07/06/83	210	2.1	9.36	3.13	470	2	1.319	1.306	1.00
07/08/83	220	2.0	9.50	0.89	256	60	2.575	2.552	1.09
07/11/83	185	4.5	9.50	2.17	380	40	1.459	1.424	1.08
07/13/83	236	10.0	9.50	2.85	360	12	1.965	1.881	1.03
07/15/83	196	8.5	9.50	2.85	360	12	1.632	1.561	1.03
07/20/83	277	9.0	9.50	2.63	320	18	2.594	2.510	1.05
07/22/83	285	3.0	9.50	3.17	385	0	2.218	2.195	1.00
07/25/83	224	3.0	9.50	2.84	285	10	2.355	2.324	1.03
07/27/83	236	3.5	9.50	1.80	219	53	3.229	3.182	0.87
07/29/83	254	6.0	9.52	2.56	248	16	3.076	3.003	1.05
08/01/83	220	13.0	9.40	2.60	239	16	2.730	2.568	1.04
08/03/83	240	9.5	9.40	2.82	270	10	2.636	2.531	1.03
08/05/83	261	14.0	9.22	2.30	288	27	2.636	2.494	1.08
08/10/83	186	18.5	9.50	2.55	306	34	1.822	1.640	0.95
08/12/83	209	4.5	9.50	2.40	300	17	2.088	2.043	1.13
MEAN	229	7.0	9.46	2.54	322	21	2.234	2.163	1.03
S.DEV	29.67	5	.07	.56	76.3	17.54	.59	.58	.05
C V %	12.9	71.1	.8	22.4	23.6	84.2	26.5	26.8	5.8

COMPOUND = CADMIUM THETA C = 3

PARAMETER = BOD VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	220	2.4	9.65	0.85	660	12	1.015	1.004	3.14
07/06/83	210	1.2	9.50	1.00	750	6	0.839	0.834	2.97
07/11/83	185	2.5	9.43	1.00	779	0	0.706	0.697	3.17
07/15/83	196	5.0	9.50	1.00	720	0	0.816	0.795	3.17
07/18/83	258	10.0	9.50	0.58	600	30	1.289	1.239	3.09
07/20/83	277	4.5	9.50	1.05	730	0	1.137	1.119	3.02
07/22/83	285	3.0	9.50	1.05	702	0	1.217	1.204	3.02
07/25/83	224	1.5	9.43	1.05	655	0	1.017	1.011	3.02
07/27/83	236	2.5	9.50	1.05	686	0	1.031	1.020	3.02
07/29/83	254	3.0	9.50	1.01	726	3	1.048	1.036	3.03
08/01/83	220	3.5	9.50	1.05	730	0	0.903	0.889	3.02
08/03/83	240	3.5	9.50	1.05	689	0	1.044	1.029	3.02
08/05/83	261	5.0	9.50	0.84	749	17	1.044	1.024	3.06
08/10/83	186	5.0	9.50	0.79	716	20	0.779	0.758	3.07
08/12/83	209	2.5	9.50	0.98	726	6	0.863	0.852	3.02
MEAN	231	3.7	9.50	0.96	708	6	0.983	0.967	3.06
S.DEV	31.48	2.13	.04	.13	44.69	9.35	.16	.15	.06
C V %	13.6	58	.5	14.1	6.3	149.2	16.6	16.4	1.9

COMPOUND = CADMIUM

THETA C = 10

PARAMETER = BOD

VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	220	2.5	9.50	0.00	482	22	1.368	1.352	7.31
07/06/83	210	0.8	9.57	0.14	1295	24	0.490	0.488	10.07
07/08/83	220	2.0	9.50	0.00	980	26	0.673	0.667	12.58
07/15/83	196	1.5	9.65	0.13	800	18	0.746	0.740	9.21
07/20/83	277	1.5	9.57	0.32	1420	0	0.589	0.586	9.91
07/22/83	285	2.0	9.50	0.32	1520	0	0.562	0.558	9.91
07/25/83	224	1.0	9.50	0.32	1370	0	0.490	0.488	9.91
07/27/83	236	3.0	9.50	0.32	1480	0	0.478	0.472	9.91
07/29/83	254	1.5	9.60	0.29	1310	4	0.587	0.584	9.96
08/01/83	220	1.5	9.55	0.32	1386	0	0.478	0.475	9.91
08/03/83	240	1.0	9.50	0.32	1515	0	0.475	0.473	9.91
08/05/83	261	2.5	9.50	0.29	1499	4	0.522	0.517	10.08
08/10/83	186	1.5	9.50	0.20	1472	18	0.379	0.376	10.10
08/12/83	209	1.0	9.50	0.25	1500	10	0.418	0.416	10.17
MEAN	231	1.7	9.53	0.23	1288	9	0.589	0.585	9.92
S.DEV	29.29	.66	.04	.11	314.08	10.31	.24	.24	1.05
C V %	12.6	39.8	.5	51.3	24.3	114.5	41.4	41.1	10.6

COMPOUND = CADMIUM   THETA C = 1

PARAMETER = COD   VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/15/83	260	60.0	9.50	2.85	360	12	2.164	1.665	1.03
07/22/83	290	60.0	9.50	3.17	385	0	2.257	1.790	1.00
07/29/83	290	29.0	9.50	2.56	248	16	3.504	3.154	1.05
08/05/83	270	50.0	9.20	2.30	288	27	2.721	2.217	1.08
08/12/83	270	37.0	9.50	2.40	300	17	2.697	2.328	1.13
MEAN	276	47.2	9.44	2.66	316	14	2.669	2.231	1.06
S.DEV	13.41	13.88	.13	.35	55.58	9.76	.53	.58	.04
C V %	4.8	29.4	1.4	13.3	17.5	67.7	19.8	26.2	4.6

```
----------------------------------------------------------------------------------

    COMPOUND = CADMIUM                        THETA C = 3

    PARAMETER = COD                           VOLUME-REACTOR = 3.17

--------------------------------------------------------------------------------------
    DATE     Si       Se        F     Fw      X       Xe      FSi    F(Si-Se)   TC
    1983                                                      ---    --------
                                                              XV        XV
--------------------------------------------------------------------------------------

    07/15/83   260    50.0    9.50  1.05     720
    07/22/83   290    54.0    9.50  1.05     702       0     1.082   0.874      3.02
    07/29/83   290    38.0    9.50  1.01     720       0     1.238   1.007      3.02
    08/05/83   270    38.0    9.50  0.84     749       3     1.207   1.049      3.03
    08/12/83   270    33.0    9.50  0.98     726      17     1.080   0.928      3.06
                                                        6     1.115   0.978      3.02
    MEAN     276    42.6    9.50  0.99     723       5     1.144   0.967      3.03
    S.DEV 13.41     8.93    0      .08    16.9     7.04     .07     .06        .01
    C V % 4.8       20.9    0     8.8     2.3    135.5    6.4     7           .5
----------------------------------------------------------------------------------
```

COMPOUND = CADMIUM

PARAMETER = COD

THETA C = 10

VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/08/83	365	16.0	9.50	0.00	980	26	1.116	1.067	12.58
07/15/83	260	17.0	9.65	0.13	800	18	0.989	0.925	9.21
07/22/83	290	29.0	9.50	0.30	1520	4	0.572	0.515	9.78
07/29/83	290	32.0	9.60	0.29	1310	4	0.670	0.596	9.96
08/05/83	270	29.0	9.50	0.29	1499	4	0.540	0.482	10.08
08/07/83	270	29.0	9.50	0.25	1500	10	0.539	0.481	10.17
MEAN	291	25.3	9.54	0.21	1268	11	0.738	0.678	10.29
S.DEV	38.26	6.94	.06	.12	308.03	9.18	.25	.25	1.16
C V %	13.1	27.4	.6	57.5	24.2	83.5	34.1	37.4	11.3

```
----------------------------------------------------------------------

    COMPOUND = CADMIUM                    THETA C = 1

    PARAMETER = TOC                       VOLUME-REACTOR = 3.17

--------------------------------------------------------------------------
    DATE     Si      Se       F    Fw      X      Xe    FSi   F(Si-Se)  TC
    1983                                                ---   --------
                                                         XV      XV
--------------------------------------------------------------------------

    07/04/83   132    19.0    9.50  3.04   470      4    0.842  0.721     1.02
    07/06/83   175    20.0    9.36  3.13   470      2    1.099  0.974     1.00
    07/13/83   174     2.0    9.50  2.85   360     12    1.448  1.432     1.03
    07/15/83   143    36.0    9.50  2.85   360     12    1.190  0.891     1.03
    07/20/83   159    30.0    9.50  2.63   320     18    1.489  1.208     1.05
    07/22/83   191    17.0    9.50  3.17   385      0    1.487  1.354     1.00

    MEAN    162    20.7   9.48  2.95    394     8     1.259  1.097     1.02
    S.DEV 22.01    11.72   .05    .2  62.32   7.04     .26    .27     .01
    C V % 13.5     56.7    .6    6.9  15.8   88      20.8   25.4      1.8

----------------------------------------------------------------------
```

COMPOUND = CADMIUM　　　　THETA C = 3

PARAMETER = TOC　　　　VOLUME-REACTOR = 3.17

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	132	30.0	9.65	0.85	660	12	0.609	0.470	3.14
07/06/83	175	46.0	9.50	1.00	750	6	0.699	0.515	2.97
07/11/83	164	16.0	9.43	1.00	779	0	0.626	0.565	3.17
07/15/83	143	34.0	9.50	1.00	720	0	0.595	0.454	3.17
07/20/83	159	16.0	9.50	1.05	730	0	0.653	0.587	3.02
07/22/83	191	20.0	9.50	1.05	702	0	0.815	0.730	3.02
MEAN	161	27.0	9.51	0.99	724	3	0.666	0.554	3.08
S.DEV	21.32	11.91	.07	.07	40.82	5.01	.08	.1	.08
C V %	13.2	44.1	.7	7.4	5.6	167.3	12.2	18.1	2.8

```
--------------------------------------------------------------------------------

     COMPOUND = CADMIUM                    THETA C = 10

     PARAMETER = TOC                       VOLUME-REACTOR = 3.17

------------------------------------------------------------------------------------
     DATE      Si      Se      F     Fw      X      Xe     FSi     F(Si-Se)   TC
     1983                                                  ---     --------
                                                            XV        XV
------------------------------------------------------------------------------------

     07/04/83   132    33.0   9.50  0.00    482     22    0.821   0.616     7.31
     07/06/83   175    10.0   9.57  0.14   1295     24    0.408   0.385    10.07
     07/08/83   153     7.0   9.50  0.00    980     26    0.468   0.446    12.58
     07/15/83   143     1.0   9.65  0.13    800     18    0.544   0.540     9.21
     07/20/83   159    11.0   9.57  0.32   1420      0    0.338   0.315     9.91
     07/22/83   191    18.0   9.50  0.32   1520      0    0.377   0.341     9.91
     07/18/83   170    37.0   9.50  0.00   1231     40    0.414   0.324    10.27

     MEAN    160    16.7   9.54  0.13  1104     19    0.481   0.424      9.89
     S.DEV 20.03    13.52   .05    .14  369.72  14.4   .16     .11       1.55
     C V % 12.4     80.9    .6    110.1  33.4   77.5  34      27.4      15.7

--------------------------------------------------------------------------------
```

COMPOUND = CHROMIUM THETA C = 1

PARAMETER = BOD VOLUME-REACTOR = 3.13

DATE 1983	Si	Se	F	Fw	X	Xe	FSi / XV	F(Si-Se) / XV	TC
07/04/83	227	15.0	9.36	2.12	300	42	2.263	2.113	1.00
07/06/83	175	16.0	9.43	2.07	250	36	2.109	1.916	1.00
07/08/83	221	14.5	9.79	2.77	330	18	1.975	1.845	1.00
07/11/83	213	35.0	9.36	2.22	250	32	2.548	2.129	1.00
07/13/83	248	18.0	9.36	2.70	230	14	3.224	2.990	1.01
07/15/83	230	6.5	8.64	2.80	320	18	1.984	1.928	1.00
07/18/83	271	3.5	9.79	2.40	380	38	2.231	2.161	1.00
07/20/83	280	6.5	9.50	3.02	480	8	1.771	1.729	1.00
07/22/83	285	3.5	9.79	3.11	620	2	1.438	1.420	1.00
07/25/83	251	2.5	9.36	3.05	490	6	1.532	1.517	1.00
07/27/83	235	2.5	9.79	3.09	349	2	2.162	2.139	1.00
07/29/83	270	4.0	9.50	3.08	540	4	1.518	1.495	1.00
08/01/83	300	3.5	9.79	2.80	680	30	1.380	1.364	1.01
08/03/83	272	3.5	9.36	2.50	300	28	2.711	2.676	1.00
08/05/83	289	4.0	9.79	3.03	670	10	1.349	1.330	1.00
08/08/83	232	6.0	9.79	2.61	480	32	1.512	1.473	1.01
08/10/83	283	5.0	9.79	2.16	410	52	2.159	2.121	1.00
08/12/83	268	3.5	9.79	2.30	440	50	1.905	1.880	0.99
MEAN	253	8.8	9.55	2.66	418	23	1.987	1.902	1.00
S.DEV	32.59	8.27	.3	.37	141.97	16.47	.5	.44	0
C V %	12.8	34.2	3.1	13.9	33.9	70.2	25.4	23.6	.4

COMPOUND = CHROMIUM THETA C = 3

PARAMETER = BOD VOLUME-REACTOR = 3.14

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	227	17.0	9.36	0.32	650	52	1.041	0.963	3.01
07/06/83	175	18.5	9.50	0.88	1040	20	0.509	0.455	3.00
07/08/83	221	15.5	9.36	0.00	360	56	1.830	1.702	2.16
07/11/83	213	15.5	8.64	0.98	430	4	1.363	1.264	2.99
07/13/83	248	17.0	6.91	0.68	480	28	1.137	1.059	3.01
07/15/83	230	7.0	8.35	0.48	390	28	1.568	1.521	3.00
07/18/83	271	4.5	9.79	0.89	790	14	1.070	1.052	3.01
07/20/83	280	5.0	8.64	1.00	1340	10	0.575	0.565	2.98
07/22/83	285	2.0	9.36	1.03	1240	2	0.685	0.680	3.00
07/25/83	251	0.5	8.64	0.99	1290	8	0.535	0.534	3.03
07/27/83	235	2.0	8.93	1.03	1230	2	0.543	0.539	3.01
07/29/83	270	3.0	8.64	1.02	1180	4	0.630	0.623	3.00
08/01/83	300	2.5	9.79	1.03	1290	2	0.725	0.719	3.01
08/03/83	272	2.5	9.07	0.93	1130	16	0.695	0.689	3.00
08/05/83	289	3.0	8.64	1.05	1370	0	0.580	0.574	2.99
08/08/83	232	2.0	9.50	0.92	1480	22	0.474	0.470	3.00
08/10/83	283	3.0	9.36	0.99	1250	8	0.675	0.668	3.01
08/12/83	268	2.5	9.50	0.96	1290	12	0.629	0.623	3.02
MEAN	253	6.8	9.00	0.84	1013	16	0.848	0.817	2.96
S.DEV	32.59	6.47	.68	.29	383.46	16.36	.39	.36	.2
C V %	12.8	94.7	7.6	34.5	37.8	102.2	46.9	44.9	6.7

COMPOUND = CHROMIUM THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	227	4.0	9.36	0.19	2140	28	0.320	0.315	10.00
07/08/83	221	16.0	8.93	0.17	1930	32	0.330	0.306	9.99
07/11/83	213	4.0	8.93	0.31	2090	0	0.294	0.288	10.00
07/13/83	248	6.0	9.65	0.31	1590	0	0.486	0.474	10.00
07/15/83	230	2.0	7.92	0.28	2360	8	0.249	0.247	10.13
07/18/83	271	2.5	9.79	0.25	2100	14	0.408	0.404	9.89
07/20/83	280	2.5	9.36	0.29	2500	6	0.338	0.335	9.94
07/22/83	285	1.0	9.50	0.27	2370	10	0.369	0.367	10.03
07/25/83	251	1.5	9.79	0.30	2240	2	0.354	0.352	10.05
07/27/83	235	1.0	9.79	0.29	2420	6	0.307	0.305	9.89
07/29/83	270	2.0	9.36	0.18	2370	34	0.344	0.341	9.95
08/01/83	300	1.0	8.93	0.18	2340	36	0.369	0.368	9.85
08/03/83	272	1.0	9.36	0.23	2530	22	0.325	0.323	10.02
08/05/83	289	2.5	9.79	0.23	3170	26	0.288	0.285	10.05
08/08/83	232	1.5	9.79	0.21	2850	30	0.257	0.255	9.97
08/12/83	268	1.5	9.50	0.21	2910	32	0.282	0.281	9.93
MEAN	256	3.1	9.36	0.24	2369	18	0.332	0.328	9.98
S.DEV	27.02	3.69	.49	.05	385.66	13.33	.05	.05	.07
C V %	10.5	119.3	5.2	20.7	16.2	74.6	17.6	17.5	.7

```
-----------------------------------------------------------------------------

COMPOUND = CHROMIUM                THETA C = 1

PARAMETER = COD                    VOLUME-REACTOR = 3.13

----------------------------------------------------------------------------------
DATE    Si     Se      F    Fw     X     Xe     FSi   F(Si-Se)    TC
1983                                             XV     XV
----------------------------------------------------------------------------------

07/08/83   350   13.0   9.79  2.77   350    18    3.128  3.012     1.00
07/15/83   365   37.0   8.64  2.80   320    18    3.149  2.829     1.00
07/22/83   350   30.0   9.50  3.11   620     2    1.713  1.567     1.00
07/29/83   320   39.0   9.50  3.08   540     4    1.799  1.579     1.00
08/05/83   320   50.0   9.79  3.03   670    10    1.494  1.260     1.00
08/12/83   350   60.0   9.79  2.30   440    50    2.488  2.062     0.99

MEAN    343   38.2   9.50  2.85   490    17    2.295  2.051     1.00
S.DEV 18.37   16.24   .44    .3 143.38  17.51   .73    .72      0
C V % 5.3      42.5   4.6   10.6  29.2  103    31.9    35.2     .2

-----------------------------------------------------------------------------
```

```
----------------------------------------------------------------------------

    COMPOUND = CHROMIUM                  THETA C = 3

    PARAMETER = COD                      VOLUME-REACTOR = 3.14

--------------------------------------------------------------------------------
    DATE     Si      Se        F    Fw      X      Xe     FSi    F(Si-Se)  TC
    1983                                                  ---    --------
                                                           XV       XV
--------------------------------------------------------------------------------

    07/08/83    350    21.5    9.36  0.00    360     56     2.898  2.720       2.16
    07/15/83    365    50.0    8.35  0.48    390     28     2.489  2.148       3.00
    07/22/83    350    25.0    9.36  1.03   1240      2     0.841  0.781       3.01
    07/29/83    320    28.0    8.64  1.02   1180      4     0.746  0.681       3.00
    08/05/83    320    30.0    8.64  1.05   1370      0     0.643  0.582       2.99
    08/12/83    350    25.0    9.50  0.96   1220     12     0.868  0.806       3.01

    MEAN     343     29.9    8.98  0.76    960     17     1.414  1.286      2.86
    S.DEV 18.37     10.25    .48    .42  457.68  21.67  1       .91       .34
    C V % 5.3       34.2    5.4    56.7  47.6  127.5  70.8    70.7       12

----------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------

    COMPOUND = CHROMIUM                    THETA C = 10

    PARAMETER = COD                        VOLUME-REACTOR = 3.1

------------------------------------------------------------------------------
    DATE     Si      Se        F     Fw      X      Xe     FSi    F(Si-Se)   TC
    1983                                                   ---    --------
                                                           XV        XV
------------------------------------------------------------------------------

    07/08/83   350    14.0    9.36  0.17   1930     32    0.548  0.526      9.77
    07/15/83   365    57.0    7.92  0.28   2360      8    0.395  0.333     10.13
    07/22/83   350    20.0    9.79  0.27   2370     10    0.466  0.440      9.99
    07/29/83   320    40.0    9.36  0.18   2370     34    0.408  0.357      9.95
    08/05/83   320    29.0    9.79  0.23   3170     26    0.319  0.290     10.05
    08/12/83   350    23.0    9.50  0.21   2910     32    0.369  0.344      9.93

    MEAN     343    30.5    9.29  0.22   2518     24    0.417  0.382      9.97
    S.DEV  18.37    15.7     .69   .04  445.7  11.69     .08    .08       .12
    C V % 5.3       51.4     7.5  20.9   17.6   49.3    19.1   22.4       1.2

---------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------------

  COMPOUND = CHROMIUM                           THETA C = 1

  PARAMETER = TOC                               VOLUME-REACTOR = 3.13

--------------------------------------------------------------------------------------
  DATE     Si       Se       F     Fw      X       Xe      FSi     F(Si-Se)    TC
  1983                                                     ---     --------
                                                            XV        XV
--------------------------------------------------------------------------------------

  07/11/83   172    52.0    9.36  2.22    250      32     2.057   1.435
  07/13/83   182    42.0    9.36  2.70    230      14     2.366   1.820      1.00
  07/15/83   184    98.0    8.64  2.80    320      18     1.587   0.742      1.01
  07/18/83   168    27.0    9.79  2.40    380      38     1.383   1.161      1.00
  07/20/83   183    11.0    9.36  3.02    480       8     1.140   1.072      1.00
  07/22/83   198     7.0    9.50  3.11    620       2     0.969   0.935      1.00
  MEAN    181     39.5   9.34  2.71    380      19    1.584  1.194            1.00
  S.DEV 10.51     33.49   .37    .34  148.72  13.89   .53     .38          1.00
  C V % 5.8       84.7    4     12.7   39.1   74.4   34      32.1          0
                                                                           .3
--------------------------------------------------------------------------------------
```

COMPOUND = CHROMIUM

PARAMETER = TOC

THETA C = 3

VOLUME-REACTOR = 3.14

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/11/83	172	50.0	8.64	0.98	430	4	1.101	0.781	3.00
07/13/83	182	32.0	6.91	0.68	480	28	0.834	0.688	3.01
07/15/83	184	17.0	8.35	0.48	390	28	1.255	1.139	3.00
07/18/83	168	23.0	9.79	0.89	790	14	0.663	0.572	3.01
07/20/83	183	12.0	8.64	1.00	1340	10	0.376	0.351	2.98
07/22/83	198	18.0	9.36	1.03	1240	2	0.476	0.433	3.01
MEAN	181	25.3	8.62	0.84	778	14	0.784	0.661	3.00
S.DEV	10.51	13.85	.99	.21	421.87	11.41	.34	.28	.01
C V %	5.8	54.6	11.5	25.8	54.2	79.6	44.1	42.7	.3

```
------------------------------------------------------------------------------

   COMPOUND = CHROMIUM                      THETA C = 10

   PARAMETER = TOC                          VOLUME-REACTOR = 3.1

-----------------------------------------------------------------------------------
   DATE     Si      Se       F     Fw      X       Xe     FSi    F(Si-Se)   TC
   1983                                                   ---    --------
                                                          XV       XV
-----------------------------------------------------------------------------------

   07/11/83   172    23.0    8.93  0.31   2090      0     0.237  0.205     10.00
   07/13/83   182    25.0    9.65  0.31   1590      0     0.356  0.307     10.00
   07/15/83   184    23.0    7.92  0.28   2360      8     0.199  0.174     10.13
   07/18/83   168    23.0    9.79  0.25   2100     14     0.253  0.218      9.89
   07/20/83   183     1.0    9.50  0.29   2500      6     0.224  0.223      9.93
   07/22/83   198    13.0    9.79  0.27   2370     10     0.264  0.247      9.99

   MEAN    181    18.0   9.26  0.29  2168      6    0.256  0.229      9.99
   S.DEV 10.51    9.35    .73   .02  326.39  5.57    .05    .04       .08
   C V % 5.8      51.9    7.8   8.2  15       88    21.2   19.6       .8
------------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------

   COMPOUND = COMBINED                    THETA C = 1

   PARAMETER = BOD                        VOLUME-REACTOR = 2.95

------------------------------------------------------------------------------
   DATE     Si      Se       F     Fw      X      Xe     FSi     F(Si-Se)   TC
   1983                                                  ---     --------
                                                          XV        XV
------------------------------------------------------------------------------

   07/08/83   229   14.2    8.93  2.38    230     20     3.014  2.827      1.00
   07/08/83   250   15.0    8.93  2.22    110     12     6.880  6.467      1.00
   07/11/83   262   35.5    7.49  2.70    140      8     4.752  4.108      0.99
   07/13/83   259   36.5    8.35  1.70    200     36     3.666  3.149      1.02
   07/18/83   273    7.0    8.35  2.55    290     20     2.665  2.596      1.00
   07/20/83   290    8.0    8.64  2.50    380     28     2.235  2.173      1.00
   07/22/83   285    5.5    8.93  2.80    450     10     1.917  1.880      1.00
   07/25/83   258    6.0    8.64  2.80    580     14     1.303  1.273      1.00
   07/27/83   261   21.0    8.93  2.83    410      8     1.927  1.772      1.00
   07/29/83   278    9.0    8.64  2.80    490     12     1.662  1.608      1.00
   08/01/83   306    9.5    8.93  2.90    560      4     1.654  1.603      1.00
   08/03/83   291    8.0    9.36  2.80    510     10     1.810  1.761      1.01
   08/05/83   286   11.5    8.93  2.91    540      4     1.603  1.539      1.00
   08/08/83   265   11.5    8.93  2.85    720     12     1.114  1.066      1.00
   08/10/83   186   10.0    8.93  2.83    510     10     1.104  1.045      1.00
   08/12/83   251    8.5    8.93  2.73    680     24     1.117  1.080      1.00

   MEAN    264    13.5    8.74  2.64    425     15     2.401  2.247      1.00
   S.DEV 28.42    9.57     .41   .31  185.54   8.86    1.55   1.4        0
   C V % 10.7     70.7    4.7   12     43.6   61.1    64.8   62.5       .5

---------------------------------------------------------------------------
```

COMPOUND = COMBINED

PARAMETER = BOD

THETA C = 3

VOLUME-REACTOR = 3.12

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	229	19.5	9.36	1.00	570	0	1.205	1.103	3.12
07/06/83	235	19.0	9.36	0.64	610	26	1.156	1.062	3.08
07/08/83	250	16.0	9.36	1.00	652	0	1.150	1.077	3.12
07/11/83	262	17.0	9.36	1.00	888	0	0.885	0.828	3.12
07/13/83	259	38.0	9.36	1.00	920	0	0.845	0.721	3.12
07/15/83	218	24.0	9.36	0.92	680	8	0.962	0.856	3.06
07/18/83	273	12.0	9.36	0.66	686	28	1.194	1.141	3.07
07/20/83	290	15.0	9.36	1.00	880	0	0.989	0.938	3.12
07/22/83	285	26.0	9.36	1.00	714	0	1.197	1.088	3.12
07/25/83	258	13.5	9.36	0.90	660	10	1.173	1.111	3.03
07/27/83	261	30.0	9.50	0.62	411	18	1.934	1.711	3.09
07/29/83	278	10.0	9.48	0.76	605	18	1.396	1.346	3.06
08/01/83	306	17.0	9.60	0.66	500	20	1.883	1.778	3.07
08/03/83	291	17.5	9.40	0.92	612	8	1.433	1.346	3.03
08/05/83	286	5.0	9.50	0.83	542	12	1.607	1.579	3.05
08/08/83	265	5.0	9.42	0.82	654	15	1.223	1.200	3.07
08/10/83	186	5.0	9.50	1.00	686	10	0.826	0.803	2.78
08/12/83	251	9.0	9.45	0.80	668	17	1.138	1.097	3.06
MEAN	260	16.6	9.41	0.86	663	11	1.233	1.155	3.07
S.DEV	29.51	8.86	.07	.14	130.62	9.35	.31	.3	.07
C V %	11.3	53.4	.7	16.5	19.6	88.6	25.7	26	2.5

COMPOUND = COMBINED THETA C = 10

PARAMETER = BOD VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/04/83	229	3.5	9.50	0.27	1650	8	0.425	0.419	9.85
07/06/83	235	20.0	9.22	0.18	1130	16	0.619	0.566	10.06
07/08/83	250	28.0	9.22	0.12	1310	28	0.568	0.504	9.86
07/11/83	262	7.5	8.93	0.33	1540	0	0.490	0.476	9.39
07/13/83	259	3.5	9.22	0.27	1740	8	0.443	0.437	9.96
07/15/83	218	3.0	9.22	0.33	1660	0	0.391	0.385	9.39
07/18/83	273	3.0	9.22	0.25	1830	12	0.444	0.439	10.04
07/20/83	290	3.0	8.93	0.29	1750	4	0.477	0.472	10.01
07/22/83	285	2.5	9.22	0.33	1710	0	0.496	0.491	9.39
07/25/83	258	2.5	9.50	0.27	1810	8	0.437	0.433	9.97
07/27/83	261	3.0	9.22	0.25	1800	12	0.431	0.426	10.01
07/29/83	278	3.0	9.22	0.19	1780	24	0.465	0.459	9.94
08/01/83	306	6.5	9.07	0.14	1890	36	0.474	6.464	10.00
08/03/83	291	10.5	9.22	0.22	1960	20	0.442	0.426	9.94
08/05/83	286	3.0	9.50	0.26	2040	12	0.430	0.425	9.86
08/08/83	265	2.0	9.22	0.31	2010	0	0.392	0.389	10.00
08/10/83	186	2.0	9.78	0.31	1890	0	0.310	0.307	10.00
08/12/83	251	2.5	9.50	0.25	1830	12	0.420	0.416	9.98
MEAN	260	6.1	9.27	0.25	1741	11	0.453	0.441	9.87
S.DEV	29.51	7.02	.21	.06	229.46	10.49	.06	.05	.22
C V %	11.3	115.9	2.2	24.8	13.1	94.4	14.7	12.4	2.3

```
--------------------------------------------------------------------------------

   COMPOUND = COMBINED                  THETA C = 1

   PARAMETER = COD                      VOLUME-REACTOR = 2.95

-------------------------------------------------------------------------------------
   DATE     Si      Se      F    Fw      X      Xe     FSi    F(Si-Se)  TC
   1983                                                ---    --------
                                                       XV        XV
-------------------------------------------------------------------------------------

   07/08/83   360    20.0    8.93  2.22    110     12    9.907  9.357      1.00
   07/22/83   320    55.0    8.93  2.80    450     10    2.153  1.783      1.00
   07/29/83   350    38.0    8.64  2.80    490     12    2.092  1.865      1.00
   08/05/83   330    46.0    8.93  2.91    540      4    1.850  1.592      1.00
   08/12/83   320    52.0    8.93  2.73    680     24    1.425  1.193      1.00

   MEAN    336    42.2   8.87  2.69   454     12    3.485  3.158      1.00
   S.DEV 18.16    14      .12   .27  211.02  7.26   3.6     3.47       0
   C V % 5.4      33.1   1.4   10    46.4   58.5   103.3  110         .2
--------------------------------------------------------------------------------
```

COMPOUND = COMBINED   THETA C = 3

PARAMETER = COD   VOLUME-REACTOR = 3.12

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/06/83	360	43.0	9.36	0.64	610	26	1.770	1.534	3.08
07/22/83	320	70.0	9.36	1.00	714	0	1.345	1.050	3.12
07/29/83	350	45.0	9.48	0.76	605	18	1.758	1.532	3.06
08/05/83	330	33.0	9.50	0.83	542	12	1.854	1.669	3.05
08/12/83	320	40.0	9.45	0.80	668	17	1.451	1.270	3.06
MEAN	336	47.2	9.43	0.81	628	15	1.636	1.411	3.08
S.DEV	18.16	13.95	.06	.13	65.65	9.58	.22	.24	.02
C V %	5.4	29.5	.7	16.1	10.4	65.6	13.6	17.5	.9

COMPOUND = COMBINED
PARAMETER = COD

THETA C = 10
VOLUME-REACTOR = 3.1

DATE 1983	Si	Se	F	Fw	X	Xe	$\frac{FSi}{XV}$	$\frac{F(Si-Se)}{XV}$	TC
07/15/83	330	20.0	9.22	0.33	1660	0	0.591	0.555	9.39
07/22/83	320	35.0	9.22	0.33	1710	0	0.557	0.496	9.39
07/29/83	350	42.0	9.22	0.19	1780	24	0.585	0.515	9.94
08/05/83	330	29.0	9.50	0.26	2040	12	0.496	0.452	9.86
08/12/83	320	23.0	9.50	0.25	1830	12	0.536	0.497	9.98
MEAN	330	29.8	9.33	0.27	1804	10	0.553	0.503	9.71
S.DEV	12.24	8.92	.15	.05	147.07	10.03	.03	.03	.29
C V %	3.7	29.9	1.6	21.8	8.1	104.5	7	7.4	3

```
--------------------------------------------------------------------------------

     COMPOUND = COMBINED                  THETA C = 1

     PARAMETER = TOC                      VOLUME-REACTOR = 2.95

------------------------------------------------------------------------------------
     DATE     Si       Se        F     Fw      X      Xe      FSi     F(Si-Se)   TC
     1983                                                     ---     --------
                                                              XV       XV
------------------------------------------------------------------------------------

     07/11/83    149    57.0    7.49  2.70    140      8     2.702  1.668      0.99
     07/15/83    173    38.0    7.49  0.00    120     52     3.660  2.856      0.91
     07/18/83    189    22.0    8.35  2.55    290     20     1.845  1.630      1.00
     07/20/83    169    28.0    8.64  2.50    380     28     1.303  1.087      1.00
     07/22/83    173    34.0    8.93  2.80    450     10     1.164  0.935      1.00

     MEAN    171    35.8    8.18  2.11    276     24     2.135  1.635      0.98
     S.DEV 14.31    13.31    .66    1.18  145.01  17.79  1.04   .75       .04
     C V % 8.3      37.1    8       56.1  52.5  75.4    48.9   46.2       4.1

--------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------

    COMPOUND = COMBINED                     THETA C = 3

    PARAMETER = TOC                         VOLUME-REACTOR = 3.12

--------------------------------------------------------------------------------
    DATE     Si       Se        F     Fw      X      Xe     FSi    F(Si-Se)   TC
    1983                                                    ---    --------
                                                            XV       XV
--------------------------------------------------------------------------------

    07/11/83   149    63.0    9.36  1.00    888      0    0.503  0.291      3.12
    07/15/83   173    20.0    9.36  0.92    680      8    0.763  0.675      3.06
    07/18/83   189    26.0    9.36  0.66    686     28    0.827  0.713      3.07
    07/20/83   169    19.0    9.36  1.00    880      0    0.576  0.511      3.12
    07/22/83   173    42.0    9.36  1.00    714      0    0.727  0.550      3.12

    MEAN    171    34.0    9.36  0.92    770      7     0.679  0.548      3.10
    S.DEV 14.31    18.64   0       .14  105.25  12.13   .13    .16       .02
    C V % 8.3      54.8    0      16    13.6   168.5   19.8   30.3       .9

------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------

     COMPOUND = COMBINED                 THETA C = 10

     PARAMETER = TOC                     VOLUME-REACTOR = 3.1

----------------------------------------------------------------------------------
     DATE      Si      Se       F    Fw       X      Xe     FSi    F(Si-Se)   TC
     1983                                                    XV       XV
----------------------------------------------------------------------------------

     07/11/83    149     8.0    8.93  0.33   1540      0     0.279  0.264      9.39
     07/15/83    173    29.0    9.22  0.33   1660      0     0.310  0.258      9.39
     07/18/83    189    24.0    9.22  0.25   1830     12     0.307  0.268     10.04
     07/20/83    169    21.0    8.93  0.29   1750      4     0.278  0.244     10.01
     07/22/83    173    23.0    9.22  0.33   1710      0     0.301  0.261      9.39

     MEAN    171     21.0    9.10  0.31   1698     3     0.295  0.259      9.65
     S.DEV 14.31      7.84    .15    .03   108.02  5.21    .01     0         .34
     C V % 8.3       37.3    1.7    11.6   6.3   162.9   5.2     3.6        3.5

-------------------------------------------------------------------------------
```